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CLINICAL SURGERY.

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REPORT OF SURGICAL CASES

OCCURRING IN

HOSPITAL PRACTICE.

BY

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*From the Edinburgh Medical and Surgical Journal for January 1854.*

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*Clinical Surgery—Report of Surgical Cases occurring in Hospital Practice, &c.* By R. J. MACKENZIE, Esq., F.R.C.S.E., Surgeon to the Royal Infirmary, and Lecturer on Surgery.

*Loose Cartilages in the Knee-joint.*

In the number of the *Monthly Journal of Medical Science* for November 1852, Mr Syme drew attention to a new mode of remedying this very troublesome affection; and the following cases illustrate well the serious consequences which occasionally followed the old mode of removing these bodies, as contrasted with the safety of the treatment lately proposed by Mr Syme, which is simple as regards the mode of operating, and appears to be effectual as regards its results.

Sarah Salkeld, a domestic servant, aged twenty, was admitted under my care in the hospital, December 3, 1850, on account of a loose cartilage in the right knee-joint. She attributed the origin of her complaint to a fall on the knee when she was a child of five years of age. The knee has been weaker than the other ever since that time. Within the last three or four months, the usual annoying symptoms accompanying the presence of a loose cartilage in the joint have almost entirely prevented her from following her occupation; repeated sudden attacks of acute pain in the limb whilst walking, with simultaneous loss of power, followed by attacks of synovitis with effusion. She came to the hospital determined at all risks to have the cartilage removed. The loose body could be readily made to appear on the inner side of the patella, and could be pushed to all parts of the joint on the inner side, but it could not by any manipulations be made to appear on the outer side.

The mode more recently introduced by Mr Syme of fixing such bodies by subcutaneous incision was at this time unknown; and, as I shall mention presently, I had reason to doubt the general efficacy or safety of the mode, generally practised, of extruding the cartilage from the joint into the surrounding cellular tissue, through a subcutaneous incision of the capsule, as formerly proposed by Mr Syme and M. Goyraud, or as modified by Mr Liston. I determined, then, to remove the body by a simple incision; and, as it could be easily made to protrude under the skin, there seemed no probability of there being any difficulty in its removal.

The first incision exposed the synovial capsule, but divided

avessel, which bled so freely from both ends as to require the application of two ligatures. The second incision exposed the cartilage, which, previously transfixed by a cataract needle, was readily drawn through the opening thus made. Unfortunately, however, it was found to have a long and pretty thick pedicle; this being divided, the wound was instantly closed accurately. The cartilage was of the usual lens-like shape, and rather larger in diameter than a sixpence. All precautions were taken to secure primary union of the wound, and to avert inflammatory action, but on the second day following the operation, acute inflammation of the joint set in; profuse suppuration followed, which extended from the joint beneath the deep muscles of the thigh as far as the groin. For nearly ten months it appeared that amputation was the only probable means of saving her life. This measure, however, was happily delayed, and after nearly twelve months of great suffering her symptoms began to improve. Her convalescence, however, was protracted, and even at this date (three years after the removal of the cartilage,) her health is not thoroughly re-established. Anchylosis of the knee has taken place, and she is still unable to walk without the support of a stick.

The following short history of a similar case affords a striking contrast to that of the sufferings of this poor girl. It is one of the few cases in which Mr Syme's later mode of operating has been followed; and as the operation is one which appears to have attracted too little attention, the following instance of its simplicity and efficacy appears to me worthy of attention.

Alexander M'Brain, a fisherman from Lochgilphead, was admitted into the hospital under my care on the 16th of February 1852. For about five months previously he had suffered from weakness of the left knee-joint, which prevented him from following his occupation, and which was aggravated by repeated attacks of effusion into the joint, which always followed any attempt to walk.

Having learned from Dr Hunter of Lochgilphead that these symptoms were dependent on the presence of a loose cartilage in the joint, he came to Edinburgh for the purpose of having the body removed. He stated, on his admission, that, although he never suffered much pain in the knee, the state of the joint rendered him so useless that he was willing to submit to anything which would restore the use of the limb.

The cartilage was readily detected. It was of a flattened

shape, and of the diameter of a shilling, and could be easily pushed about to all parts of the joint.

On the 12th February, having pushed the body as far as possible outwards over the external condyle of the femur, and keeping it fixed there by the finger of an assistant, I introduced a curved tenotomy knife through the integuments, at about an inch distance, and turning the edge of the blade upon the cartilage, cut freely down upon it. Being satisfied that the joint was sufficiently opened, I pushed the cartilage edgeways into the opening and withdrew the knife.

A compress was then placed over the track of the subcutaneous wound, and a second placed on the inner side of the cartilage, so as to keep the body steadily in the above position, whilst, as a matter of precaution, a splint was placed on the back of the limb, so as to keep the joint immoveable.

No uneasiness followed this trifling operation, and the bandage was not removed till the 27th. The cartilage was then felt in the same position and evidently firmly fixed. The compress was re-applied and retained in its place by an elastic knee-cap. About a fortnight after this he was allowed to walk about, and he would have returned home had he not been suffering from a venereal sore which he had contracted on his journey from home.

He remained in the hospital till the 19th of May, when he returned home perfectly well. The cartilage was still to be felt firmly adherent in the same position, but diminished to less than a half of its original size. The limb had nearly quite regained its former strength, and he walked without any limp or uneasiness.

*November 1853.*—Dr Hunter informs me that this patient has followed his occupation as a fisherman ever since his return home, and has never experienced the least annoyance from the limb, which is as strong as ever. The cartilage can still be felt firmly fixed in its place, but reduced to a very small size.

Mr Syme, it appears, has followed this mode of fixing these cartilages in several cases, and in each case with success, and there seems every reason to believe that the plan is the most simple, safe, and effectual, which has yet been proposed for an affection, the surgical treatment of which was formerly never undertaken without some fear as to the result. Although the proposal is new, however, I think there is no reason to doubt that this very method must often have been practised (unwittingly) by those who attempted the extrusion of the cartilage from the joint, through a subcutaneous incision. This proceeding has been generally spoken of as a

very easy matter, and no doubt has been entertained as to such bodies being pushed by proper manipulations into the cellular tissue outside the joint; without denying the practicability of effecting this object, or that it has been sometimes accomplished, I may mention that repeated and varied trials of the operation on the dead body have satisfied me of the extreme difficulty of its accomplishment, and of the force which must be used to push the body entirely outside the joint through a subcutaneous opening of the synovial membrane. This appears to arise from the difficulty of rendering a sufficient extent of the synovial membrane tense, so as to allow of its free subcutaneous division. A small opening in the membrane is easily made, where the prominent edge of the cartilage pushes it outwards; but I have found it a very difficult matter to make an opening of the size of the diameter of the cartilage, or one of sufficient size to admit of its escape without using unwarrantable force in its extrusion. These observations are borne out by the fact, that repeated attempts have sometimes been made to dislodge a loose cartilage in this way without success; and the risk of exciting inflammation of the joint by using force to effect the object has been proved by the operation having been followed by a fatal result in more than one instance.

The object of the operation more recently introduced by Mr Syme, and described in the case which I have related, is to fix the cartilage in the wound of the synovial capsule, with a view of obtaining its adhesion to the surfaces of the wound. For this purpose, the joint is opened by a subcutaneous incision over the cartilage, which is previously made to project so as to render the synovial membrane tense. The cartilage is then gently pushed edgeways into the wound, when it is fixed by a compress of lint, secured by a bandage or strips of adhesive plaster. The adhesion of the cartilage to the surface of the subcutaneous wound seems to take place readily, as if the body possessed a sufficient degree of vitality to render it capable of connecting itself to the tissues with which it is kept steadily in contact. That it adheres to the opening in the synovial capsule, and is not merely partially encysted like a foreign body, seems evident from the firmness of its attachment in its new position even a few days after the operation, and from the rapid absorption which it subsequently undergoes, as evinced by its speedy diminution in size, and apparently its ultimate complete removal.



*Dislocations.*

Of the cases of dislocation which have come under my observation in hospital practice, the following appear worthy of attention,—some as instances of the rarer forms of dislocation, and others as illustrating the immense advantage gained by the use of chloroform as an auxiliary to the mechanical means employed in the reduction especially of dislocations of less recent occurrence.

*Dislocation of the head of the Thigh-Bone on the Dorsum of the Ilium—Reduction ten days after the occurrence of the injury.*

Michael Gillon, aged forty-five, a railway porter,—admitted into the hospital October 15, 1853, having ten days previously injured the right hip by a fall, whilst carrying a heavy load on his shoulders. The signs of dislocation were distinct, but the shortening of the limb not being more than one and a half inch, the great toe resting on the ball of the great toe of the opposite foot, and the possibility of flexing the thigh on the trunk to less than a right angle, led at first to the belief that the head of the bone lay in the sciatic notch. He could, however, lie flat on his back whilst the thigh was pressed down on the mattress, a position which (according to an observation of Mr Syme, and which I have seen corroborated in several instances) cannot be assumed when the head of the bone is in the sciatic notch. Previously to any attempts being made at reduction, he was placed under the full influence of chloroform, when the head of the bone, which had hitherto been felt only obscurely, was now distinctly perceived on rotation of the limb, rolling on the dorsum of the ilium.

Manual extension with the heel in the perinæum having failed, the pulleys were employed in the usual way, and extension was made, according to rule, in the axis of the dislocated limb. The head of the bone descended readily to the level of the acetabulum, but every effort to raise the head of the bone over the edge of the cotyloid cavity failed. These efforts having been continued, with one or two intervals, for above half an hour, it was suggested to me that a trial might be made of extension in a different direction. I then had the patient laid straight on his back and applied the extension in the natural axis of the limb, that is to say straight downwards. The first attempt made in this way was at once successful; the head of the bone had no sooner descended to its

proper level than it returned into the acetabulum with a distinct shock.

*Dislocation of the head of the Thigh-Bone into the Sciatic notch—Reduction between five and six weeks after the occurrence of the injury.*

A railway labourer, of moderate height, and of strong muscular development, met with an injury of the right hip from a fall of earth. Some doubt was entertained at the time of the accident as to the nature of the injury, but it was looked upon as a bruise of the joint, and treated as such for forty days, at the end of which time his surgical attendant suspected the existence of dislocation, and requested me to examine the joint. The usual signs of dislocation of the head of the bone into the sciatic notch were then well marked, and the peculiar mark of this dislocation, which I have already mentioned as pointed out to me by Mr Syme, confirmed the diagnosis; when the thigh was forcibly depressed on the mattress, the back was arched, and when the back was pushed down, the thigh was again advanced.<sup>1</sup>

The patient having been placed fully under the influence of chloroform, extension and counter-extension were applied in the usual way, viz., in the axis of the dislocated bone, whilst the head of the bone was raised by means of a sheet placed under the fold of the thigh. A continuance of these means for about twenty minutes was successful, the head of the bone returning into the acetabulum (as is commonly observed in dislocations of old standing) with scarcely any perceptible shock. The patient made a slow recovery, but ultimately regained entirely the free use of the limb.

*Dislocation of the head of the Thigh-Bone on the Os Pubis—Unsuccessful attempts at reduction nine weeks after the occurrence of the injury.*

J. A., aged forty-eight, a short but stout and muscular man, was admitted under my care in the hospital, December 17, 1850, on account of an injury of the left hip-joint, which he had sustained nine weeks previously. The state of the limb on his admission into the hospital was as follows:—Shortening to the extent of about three-quarters of an inch: eversion of the limb, the foot being nearly at a right angle with

<sup>1</sup> This peculiarity of the dislocation into the sciatic notch probably depends on the stretching of the psoas and iliacus muscles, or on the pressure of the head of the bone on the sciatic nerve, when the axis of the limb is forced towards that of the trunk.

its fellow, the knee slightly bent, the prominence of the trochanter major nearly effaced; and the globular head of the bone felt in the groin, midway between the anterior superior iliac spine and the pubes, and rolling under the hand on the limb being rotated. The femoral artery pulsated strongly over the centre of the head of the bone. Numbness of the fore part of the thigh and knee was complained of, but no pain was felt when the limb was at rest, when it was extended, abducted, or everted; the slightest attempt at inversion produced acute pain along the front of the thigh and around the knee. The mode in which the dislocation was produced was peculiar, inasmuch as it was caused by direct violence. Whilst endeavouring to cross a railway line in front of an engine travelling at full speed, he was knocked down, one of the *buffers* having struck him on the left hip. He was seen on the following day, when the parts were much swollen, by a surgeon, whose acknowledged accuracy sufficiently attests the difficulty which must have attended the diagnosis. After repeated careful examination, the injury was looked upon as a fracture, and treated by the application of the long splint.

On the day following his admission into the hospital, chloroform having been administered, reduction was attempted by extension, first in the mode recommended by Sir A. Cooper, viz., in a line behind the axis of the body, so as to draw the thigh-bone backwards, whilst the patient lay on his back on a table, about two and a half feet from the ground; next in the same direction, whilst the patient lay on the opposite side; and lastly in a line straight downwards whilst he lay on his back.

The head of the bone readily descended under the influence of the extension by pulleys to the level of the acetabulum, but repeated and violent efforts failed to raise it over the edge of the socket. At the end of an hour I desisted from further attempts at reduction, and had the patient removed to bed.

Two days afterwards I prevailed on him to submit to a second attempt, and he was again, whilst under the full influence of chloroform, subjected to the same treatment. The direction of the extension was varied as before, and the utmost extent of force employed which appeared justifiable. The head of the bone receded under the extension till it could no longer be felt, and seemed ready to enter the acetabulum, but at once returned to its abnormal position when the extension was allowed to cease. After an hour and a quarter the patient was removed to bed with the dislocation unreduced.

A good deal of pain and swelling of the limb followed this

second attempt, and he could not be prevailed on to submit to any further trials.

Three years have now elapsed since the occurrence of the injury; the head of the bone is still prominent in the groin, but moves freely with the motions of the limb. The patient can walk many miles a day without difficulty. The foot is everted and the limb is a little shortened, but he walks stoutly and with only a slight limp.

*Dislocation of the head of the Humerus into the Axilla.—Reduction ten weeks after the occurrence of the injury.*

Robert Weston, aged forty-five, a carter, was admitted into the hospital March 13, 1852, on account of an injury of the right shoulder, which he had received on January 3. He described the accident as having occurred by his falling from a cart on his side, but does not remember in what position the arm sustained the violence. The signs of the dislocation of the head of the humerus into the axilla were so distinct when he came into the hospital, that it was impossible to mistake the nature of the injury.

Having laid the patient on a mattress in the operating theatre, and administered a full dose of chloroform, I adjusted the worsted skein above the elbow, and prepared the pulleys and belt for the extension of the limb. Before applying these, however, I requested my clerk to take off his boot and apply extension with his heel in the axilla. My object in doing so was to shew the gentlemen who were present the mode of applying the extension in this way, as I had little or no expectation of its proving successful in reducing the dislocation. Extension was thus made from the wrist, whilst the muscular system was thoroughly relaxed by the full action of the chloroform, and reduction was instantly effected, the head of the bone returning into the glenoid cavity with a slight shock, and as readily as if the dislocation had occurred quite recently.

The unusual facility with which reduction was effected, led me to doubt the accuracy of the patient's statement as to the date of the accident. On farther inquiry, however, I ascertained that his statement was correct, that *seventy days* had elapsed between the occurrence of the dislocation and the reduction which had been so easily effected. I know of no instance of the reduction of a dislocation, in which the benefit of chloroform was so unequivocally marked; dislocations of the shoulder have been repeatedly reduced at a later period than ten weeks after the injury, but not, so far as I



am aware, without considerable difficulty, and much more powerful efforts than in the above case. The facility of reduction in this instance is encouraging, as regards the attempt to reduce dislocations of much older standing, when the muscular resistance is thoroughly overcome by the full action of chloroform.

*Dislocation of the sternal end of the Clavicle backwards.—  
Reduction.*

John Combe, aged twenty-six, a tall and muscular man, was brought to the hospital on account of an injury which he had received a few minutes previously in the following way :—Whilst walking along the street he tripped on the kerbstone, and falling forwards, pitched on the right collar-bone against the corner of a heavy log of wood. For a short time he was unable to rise, and when he got on his feet, he was so unsteady that he was obliged to be supported on each side whilst he walked to the hospital, a distance of two or three hundred yards. I happened to see him as he was brought in, and was struck with the remarkable appearance which he presented. The right shoulder was thrown forwards and the neck bent so that his chin nearly rested on the sternum. The veins of the neck and over the temples and forehead were turgid, and the face and lips livid from venous congestion. He staggered when he attempted to walk, and could with difficulty be made to answer any questions put to him. On raising the head the nature of the injury was very apparent. The prominence of the sternal end of the clavicle was effaced; the bone could be traced with the fingers from its acromial end sinking backwards till its sternal extremity, thrown behind the upper part of the sternum, could no longer be perceived. I directed an assistant to place his knee on the patient's back, between the shoulders, and placing a hand in front of each shoulder, to draw them forcibly backwards. A second assistant raised the head with his hands placed under the chin. I at the same time endeavoured to push my fingers behind the clavicle near the shoulder, so as to urge the bone forwards. The first attempt made in this way was immediately successful, the bone returning to its place with a distinct shock. The venous obstruction and semicomatose condition, produced by the pressure on the brachio-cephalic trunk, were at once relieved, and in the course of two or three minutes the patient had fully recovered his senses and could walk steadily. Considerable swelling followed the injury, but had nearly disappeared when he left the hospital ten days afterwards.

*Dislocation of the head of the Radius forwards, of four months' standing.*

Patriek Connor, aged twenty, a labourer, was admitted under my care in the hospital, April 30, 1851, on account of an injury of the left elbow, sustained a little above four months previously, by his having fallen, when in a state of intoxication, among the machinery of a threshing-mill. On the following day he applied to a bone-setter, who applied splints around the injured elbow, which were not removed till seven weeks afterwards. The joint remained stiff for some time, but the power of flexion and extension gradually increased as he made use of the limb. On his admission into the hospital, the arm presented the following appearance:—the upper part of the forearm was remarkably rounded; the hand could be fully pronated, but could not be rotated outwards so much as to half-way between pronation and supination; the forearm could be extended nearly to a straight line with the arm, but could not be fully flexed, the motion being suddenly checked before the elbow was bent quite to a right angle: the external condyle of the humerus appeared to project unnaturally, and immediately below it a hollow existed in the natural situation of the head of the radius; in front of the condyles of the humerus, an unnatural prominence was perceptible to the eye when the forearm was extended, and this projection could be easily felt, in any position of the arm, to consist of the head of the radius lying in front of the condyles of the humerus, where it could be perceived to roll, on rotating the bone from the hand; lastly, an inequality was observed on the posterior surface of the ulna, a short way below the olecranon, which evidently depended on the union of an oblique fracture of the ulna.

Forcible extension and counter-extension had not the slightest effect in altering the abnormal position of the head of the bone, which it was evident was firmly fixed in front of the condyles of the humerus. I therefore made no attempt at reduction. He was directed to use the limb freely, and during the short time he remained in the hospital the mobility and power of the limb appeared to increase. The power of supinating the hand, however, seemed to become even rather diminished.

About a year afterwards he was admitted as a patient into the medical department of the hospital on account of an internal affection, from which he died. I obtained the elbow-joint, the condition of which is represented in the accompanying woodcut. The two points worthy of notice in the preparation

are the position of the fracture of the ulna and the attachment of the orbicular ligament to the neck of the radius.



In another preparation in my museum of an old dislocation of the radius forwards, the ulna has been fractured in nearly the same line. A precisely similar complication of this dislocation is mentioned by Sir A. Cooper.<sup>1</sup> The explanation of the occurrence of the fracture seems very simple. The shape of the upper articulating end of the ulna is such as not to admit of its dislocation forwards, and the resistance thus offered to the violence which throws the head of the radius forwards, causes the ulna to give way. The dislocation being usually the result of indirect violence (a fall on the hand), accounts for the very oblique line of the fracture. Such a complication must render the after-treatment of the case more difficult; proper adjustment of the fracture would necessitate the extended position of the forearm, a position in which the head of the radius will have a greater tendency again to slip forwards.

The orbicular ligament (which is necessarily torn in this dislocation) has contracted adhesions on both sides to the neck of the displaced radius. This is seen on the inner side in the woodcut, and accounts in a great measure for the permanent loss of power in pronating and supinating the hand in such cases.

*Dislocation of the Head of the Radius forwards.—Reduction ten days after the occurrence of the injury.*

J. F., a girl of six years of age, was brought to me Sep-

<sup>1</sup> Dislocations and Fractures of the Joints, ed. by Mr Bransby Cooper, p. 456.

tember 30, 1853, on account of an injury of the right arm, which she had received ten days previously, by a fall whilst playing with her companions. A surgeon who saw her shortly afterwards, misled by the bent appearance of the forearm, had looked on the injury as a partial fracture of the radius, and used some force to remedy the distortion. Finding, however, that the deformity remained undiminished, he requested me to examine the arm. The signs of the injury were then very distinct; the rounding of the muscular part of the forearm, the hollow beneath the external condyle of the humerus, the prominence formed by the dislocated head of the bone in front of the condyles, and its rolling under the thumb placed over it when the radius was rotated. The diagnostic mark, however, specially mentioned by Sir A. Cooper, viz., the sudden check to the motion of flexion, was not very conspicuous; the forearm could not be bent to less than a right angle on the arm; but the sudden stop to the motion was by no means so distinctly marked as I have seen it in the same dislocation in the adult.

After attempting, without success, to reduce the dislocation without the use of chloroform, a full dose of the anæsthetic was administered. Extension was then made from the hand, the elbow being flexed, and counter-extension being made from the upper arm by an assistant. The head of the bone, under the pressure of the thumb, slipped readily into its place. A thick compress was then placed in front of the joint, and firmly secured by a bandage, the elbow being flexed at a right angle.

On removing the compress and bandage three days afterwards, I found the dislocation reproduced exactly as at first. It was easily reduced in the same manner as before without the use of chloroform; but I now flexed the forearm to the full extent on the arm, and secured it in this position by a bandage. After a fortnight I allowed the forearm to be gradually extended, and, at the end of five weeks, the child had regained the full use of the arm.

The rupture of the orbicular ligament, which must always take place in this dislocation, probably accounts for the liability to displacement after the dislocation has been reduced.

The most effectual means, I think, to prevent the recurrence of the displacement, is to flex the forearm, as in the above case, to the full extent on the arm, and to fix it in this position by a bandage. The joint being then fixed, the head of the radius cannot slip forwards, as it is prevented from doing so by the contact of the anterior surface of the condyles of the humerus.



*Rupture of Anchylosis by forcible extension.*

John Reid, aged eighteen, a tailor, was admitted under my care in the hospital, August 31, 1853, on account of sinuses behind the right knee, the result of an abscess which had formed about six weeks previously. The shape of the knee was very remarkable, the joint having been completely dislocated about ten years before. The dislocation, it appeared, had been effected by an irregular practitioner, who had violently extended the limb from the acute angle at which it had been fixed by ankylosis, the result of disease of the joint in early life.

The history given by the patient was as follows:—He received some slight injury of the knee when between three and four years of age; the result of this was “white swelling,” from which he was confined to bed for four years, and was only able to move about with crutches afterwards. The knee was ankylosed at an acute angle with the thigh. Some time afterwards

(about five years after the commencement of the disease), he was put under the care of a bone-setter, who straightened the limb by sudden and violent extension. He does not remember the exact mode in which the force was applied, but he knows that the limb was immediately brought into the position which it now holds, that the operation was accompanied by great suffering,

and that he nearly died from the profuse suppuration and



extensive superficial ulceration which followed. The limb was kept upon a splint, and in about six months his health was sufficiently restored to allow him to move about again on crutches. By degrees he became able to lay aside these artificial supports, and in about a year he was able to walk stoutly without even the aid of a stick. From that time he remained quite well, and able to walk several miles a day without difficulty, till about eleven months ago, when the knee was by accident forcibly bent under him, by which the integuments in front of the joint were extensively lacerated. The wound healed slowly, and before it was entirely cicatrized, the abscess already mentioned formed in the ham.

After about six weeks' residence in the hospital, the sinuses were closed, his general health was much improved, and the limb regained much of its former strength and usefulness. The preceding sketch of the limb, as compared with its fellow, was taken after he had again been walking about for a month or six weeks.

The condyles of the thigh-bone lie entirely in front of the head of the tibia, which projects in the ham. Osseous ankylosis has taken place. The leg and foot are much smaller than the other, but this is partly accounted for by their having been so little used for the last eleven months. The limb, though two inches shorter than the other, and though it looks shrunk, is very much larger than that of a child of eight years of age, the period at which it was forcibly extended, shewing that it has grown considerably since that period. Small and deformed as the limb is, however, it serves admirably the purposes of support and progression, and is much more useful than any artificial limb could have been had amputation been performed.<sup>1</sup>

But, although the result in this case has been successful, no one, I think, will have any doubt as to the means by which it was accomplished having been quite unjustifiable. My object in recording it is to shew under what adverse circumstances, both as regards the limb and the state of constitution, a limb *may* be restored to usefulness, and a recovery

<sup>1</sup> This patient lay in the hospital in a bed next a patient who was convalescing after the operation of excision of the knee-joint. The straight position and almost natural appearance of the limb on which excision had been performed, contrasted remarkably with the appearance produced by the dislocated bone. Surely, if complete or even partial ankylosis can be obtained after excision of the knee-joint, the limb may be expected to prove as useful, and much more so, than the limb here figured.

effected; and that in a sound constitution, and in deformity of less marked character than in the above case, the breaking up of an anchylosed joint may be undertaken with a reasonable prospect of success.

*Amputation at the Hip-Joint.*

James O'Hara, aged eighteen, was admitted into the hospital under my care, January 3, 1853, with fracture of the right thigh-bone a little below its middle. He had suffered for more than seven years from necrosis of the bone, large portions of which had exfoliated from time to time, and he had left the hospital only a month previously with sinuses on each side of the thigh still discharging matter. Whilst limping along the street on New-Year's day, he was pushed over by a drunk man, and the thigh was fractured by the fall. When brought to the hospital the limb was much distorted, the upper fragment nearly projecting through the skin anteriorly, and the lad was suffering so intensely that he intreated that the limb might be amputated immediately. The fracture was adjusted, but the extension required for this only increased his suffering, and on the following day it was necessary to remove the splint, and the limb was kept in the easiest position between pillows.

On the 5th, at the urgent request of the patient, who was much exhausted by his continued suffering, I had him removed to the operating theatre, where I promised to amputate the limb, or remove any dead portions of bone, as seemed best on examination, when he was under the influence of chloroform. On introducing my finger into an opening on each side of the thigh, I found the whole shaft of the femur at the seat of fracture in a state of necrosis, and the very scanty substitute of new bone on one side of it fractured, and detached from the soft parts to the extent of three or four inches. Those of my colleagues who were present at once agreed with me as to the propriety of amputation, the extensive detachment from the soft parts of the thin shaft of new bone rendering the prospect of union hopeless. It was a more difficult matter, however, to decide at what point amputation was to be performed. The entire upper part of the thigh-bone was much thickened; and on introducing the finger into a large sinus, which existed on the back of the thigh, near the tuberosity of the ischium, the bone was felt rough and bare in the neighbourhood of the lesser trochanter, and the probe here entered a cavity in the bone.

Under these circumstances, it appeared doubtful whether division of the bone through the highest part of its shaft would suffice for the removal of the entire disease; and as the weak state of the boy rendered the speedy completion of the incisions very desirable, so as to avoid unnecessary loss of blood, it was deemed prudent not to make any exploratory division of the bone through the trochanter, but at once to disarticulate.

The operation was performed, nearly in the way recommended by M. Malgaigne, by traufixion, and the formation of a long anterior flap; but a short posterior flap was also made, by carrying the knife a little obliquely outwards after disarticulating the head of the bone. The limb was thus severed in less than ten seconds, and the hemorrhage was so effectually controlled by my colleagues Dr Dunsmure and Mr Spence, that scarcely a teacupful of blood was lost.

The shock sustained by the system from this formidable operation was very slightly marked, a circumstance which I had previously had an opportunity of witnessing after the same operation in a similar case, and which was plainly attributable to the full influence of chloroform during the operation. When I visited him two hours after the operation, I found him smoking his pipe, and he expressed himself as highly satisfied with the relief he had obtained by the removal of the limb.

For a week after the performance of the operation, every thing progressed favourably. Union had taken place on the eighth day in the greater part of the wound, and the suppuration was moderate. He slept and ate well, and suffered little constitutional disturbance. The bandage, however, had been slightly stained with blood for two days; and during the dressing of the wound on the 12th January, a little arterial blood flowed from the centre of the wound. The bleeding ceased immediately on the application of cold; but on the following day, profuse arterial hemorrhage suddenly occurred. This was arrested by firm pressure of the flaps, compression of the femoral artery on the brim of the pelvis having no effect in checking the flow of blood. On visiting him, I found him sunk and pallid, with a weak and rapid pulse. Not more than five or six ounces of blood had escaped externally, but the stump was distended by blood. The bleeding had apparently ceased, but it was evident that its recurrence to a very small extent would prove fatal. Ligation of the common iliac artery seemed the only probable means of arresting the hemorrhage; but, before tying this vessel, I determined to remove the mass of coagulum within



the stump, and at the same time to ascertain from which part of the wound the bleeding had occurred, and whether it might not be checked by the application of a ligature to the bleeding point. Chloroform having been administered, the adhesions of the wound were separated by the finger, and, on clearing out a large mass of coagulum, the blood was seen to issue from three or four points in the posterior flap. Ligatures were applied to these vessels as quickly as possible; the wound was then closed, and the whole stump moderately compressed by the application of a bandage. The small additional loss of blood, however, thus incurred, increased the prostration. Under the free administration of stimulants, and by transfusion of fourteen ounces of blood into a vein, he rallied for a short time, but again sank, and died about two hours after the transfusion.

On examining the thigh-bone it was found expanded and rough on the surface as high as the trochanter major. Nearly the entire thickness of the shaft was in a state of necrosis for about five inches in length at the seat of fracture. The sinus below the tuberosity of the ischium led into a small cavity or abscess in the interior of the bone, in the close vicinity of the trochanter minor, and the dense walls of this cavity (as seen on a section of the bone being made) encroached on the cancellated texture of the trochanter major. The head and neck of the bone were sound.

The examination proved, I think, the propriety of the practice which had been followed. Had the saw been used, the bone must have been divided through the trochanter major; and I cannot but think that this operation is attended by a greater risk to life than the operation of disarticulation. The chief risk incurred in these operations is hemorrhage; for the vessels divided in the posterior part of the limb can be effectually compressed only after the incisions are completed, and the limb severed; and the time required for the formation of two flaps, and for the use of the saw, bears no comparison with the rapidity with which the incisions necessary for disarticulation may be effected. The soft parts cut in the two operations are nearly the same, and the greater facility of arresting the hemorrhage in the latter operation, I think, compensates for any additional risk which may be thought to be incurred by removal of the head and neck of the bone. When the disease or injury admits of division of the bone below the trochanter minor, disarticulation would of course be unjustifiable; but when the saw must be applied higher than this point, I think it is more prudent at once to remove the entire bone, than to protract

the operation even during the short time occupied in the use of the saw.

Amputation at the hip-joint has been generally regarded as a desperate measure, and one from which the patient has a very small chance of recovery. Recent experience, however, has proved the operation to be attended by a less formidable amount of mortality than is generally supposed. Improved modes of operating, and a more judicious selection of cases, may so far account for the operation being in later years attended by more favourable results than formerly; but a large measure of the recent success must certainly be attributed to the employment of anæsthetics, the effects of which modify in such a marked degree the shock which followed the operation in former years.<sup>1</sup>

<sup>1</sup> In a statistical account of the results of amputation at the hip-joint, given by Dr Stephen Smith in the *New York Journal of Medicine*, October 1852, this contrast is shewn between the mortality of the operation in former and more recent years. Thus, "for the twelve years previously to 1840, there were twenty-nine cases reported, of which six were successful and twenty-three fatal, being a mortality of over seventy-nine per cent.; while for the twelve years subsequently to that date, as already noticed, the mortality was reduced to but fourteen per cent."

Of the last three cases in which the operation has been performed in the Edinburgh Infirmary, recovery followed in two (the first by Dr Handyside, the second by Mr Syme), whilst in the third (the present case) the ordinary dangers of the operation were past, and the wound in great part healed; and the patient sank from an accident, the occurrence of which was as probable after amputation through the trochanters, as at the hip-joint.

# REPORT OF SURGICAL CASES

OCCURRING IN HOSPITAL PRACTICE.

BY

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[FROM THE MONTHLY JOURNAL OF MEDICAL SCIENCE FOR JANUARY 1852.]

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ACCORDING to the regulations of the Edinburgh Royal Infirmary, the right of delivering clinical lectures in the hospital is possessed by the Senior Ordinary Surgeon, whilst the same privilege is not extended to the Junior Ordinary Surgeon. Whilst the cases occurring in the wards allotted to the Professor of Clinical Surgery and the Senior Ordinary Surgeon are thus rendered fully available for the purposes of teaching, those occurring in the practice of the Junior Surgeon, although open to the observation of the students of the hospital, lose much of the value, which they might possess by their being made the subjects of clinical instruction.

In consequence of this arrangement, and with the view of rendering the cases occurring in my wards in the hospital more generally useful, I have occasionally published the history of those possessing unusual interest; and it is my intention now to avail myself of the opportunity offered by the Conductors of the "Monthly Journal" of publishing, from time to time, clinical reports of the cases, which fall to my charge, and which appear to me to be instructive or possessed of interest.

In doing so, I shall not restrict myself to the narration of hospital cases alone, but add the reports of any others, which appear worthy of record, occurring in ordinary practice.

## *Restoration of the Upper Lip, Cheek, and Eyelid.*

A short time ago I published the details of a case, in which I succeeded in remedying the deficiency produced by the loss of the upper lip by *the transposition of the lower lip to the situation of the upper*. I need not here repeat the different steps of the operation, as they are fully explained in the account of the above case (see "Monthly Journal of Medical Science," Oct. 1851, p. 348). The chief difficulty, encountered in the progress of the case, arose from the obstinate contraction of the mouth; and the error committed in the operation, which gave rise to this inconvenience, evidently arose, as I formerly mentioned, in the removal of the *prolabium*. This inconvenience, I have since found, may be avoided by preserving the *prolabium* of the lower lip in its situation, and uniting it to the flap brought up from over the base of the jaw.

The following case, which has lately been under treatment in my ward, will serve to illustrate the benefits of the operation, and the additional advantage of preserving the *prolabium* of the lower lip *in situ* :—

Letitia Jones, æt. 7, admitted into the hospital May 31st 1851. The deformity of the face, which is accurately represented by the accompanying wood-cut,



was the result (as in the case of Agnes Goodall), of mortification occurring during the early stage of convalescence from scarlet fever, from which she had suffered about five years previously. The sloughing had, as is usual in such cases, proceeded rapidly, nearly the entire cheek and lower eye-lid of the right side of the nose and the right half of the upper lip, being destroyed and detached in the course of a fortnight. Necrosis of the exposed bones followed, and the nasal bones, along with the greater part of the right superior maxillary, were detached some time afterwards.

When admitted into the hospital under my care, the child was in perfect health, and the parts in the neighbourhood of the extensive cicatrix in a perfectly sound condition. The absence of the lower eyelid had given rise to a vascular condition of the conjunctiva of the right eye, and the part of the cornea, which was exposed, was dull and slightly nebulous. In addition to the deformity of the features, the twisting and displacement of the mouth rendered her articulation very indistinct.

On the 6th of June, I attempted to restore the lost parts by bringing up a large flap, consisting of the lower lip (saving the *prolabium* in the manner I have formerly described, see "Monthly Journal," 1851, p. 350, Fig. 3), and of the integuments over the base of the jaw, so as to fill up the whole gap at once. The operation, however, failed from an unforeseen accident. From the effects of the chloroform, which had been pretty freely administered during the time of the operation, the poor child vomited with little cessation for thirty-six hours. From the long-continued drag thus made on the sutures, and the constant movement of the transplanted parts, union failed in the entire extent of the wound, and the flap, in spite of all means used to keep the edges together, retracted, and receded from the surface, to which it had been attached. The contracted flap, however, was retained, as far as possible, in the situation of the upper lip, and this object was so far obtained as to bring the parts into a condition nearly similar to that of simple harelip.

On the 19th of July, by the same mode of proceeding as that practised in the operation for harelip, the edges of the cleft were brought into apposition: perfect union was obtained, and the natural appearance of the upper lip was thus nearly quite restored.



The deformity of the face, however, although much diminished by the restoration of the upper lip and the replacement of the lower lip to its natural situation, was still very great, from the absence of the nose, eyelid, and greater part of the cheek: and, as the child herself and her parents were anxious that something more should be done to improve her appearance, a third operation was performed, so as to remedy, as far as possible, the remaining deficiency. This, however, was delayed for some time, in order to allow the parts to assume the position, which their subsequent contraction might give them.

On the 18th of October, the gap was filled by a large flap of skin brought from over the ramus of the jaw, the neck of the flap being situated over the upper part of the malar prominence, and its extremity corresponding to the angle of the jaw. This flap was attached by twisted and interrupted sutures to a cut surface extending from between the eyebrows along the mesial line in the former situation of the nose, and along the upper border of the new upper lip. The large flap thus transplanted retained its vitality in its entire extent, and primary union was obtained along the whole line of incision. The edges of the wound made in dissecting up the flap were united by one or two sutures at the lower extremity of the incisions. The remainder of the surface was left to granulate, and healed quickly.

The result of these operations is shown in the accompanying sketch, which



was made between six and seven weeks after the performance of the last operation. In addition to the improved appearance of the features, her articulation has been rendered much more distinct, an advantage which was contemplated in deciding at first as to the expediency of surgical interference.

The child, nothing daunted by what she had undergone (the different operations were performed while she was under the influence of chloroform), was now anxious to have her appearance still further improved by the formation of a nose. This proposal, I need scarcely say, was negative; the modified Tagliacotian operation being one, which is apparently applicable only in adults. However much the addition of a nose might have added to the present appearance of the child, the propriety of deferring the operation till the face and brow had attained their full size, cannot, I think, admit of any doubt.

The amount of improvement obtained in this case, may be estimated by comparing the above sketches, which delineate faithfully the appearances presented before and after the performance of the operations. When such extensive destruction of the features has taken place as in this case, operative surgery cannot be expected by any means to restore the natural appearance of the features; an approximation to the natural form of the parts is all that can be looked for.

Thus, flaps of skin transplanted to the situation of the eyelids, form, under the most favourable circumstances, but a poor substitute for the natural lids. In the present case, making full allowance for the subsequent contraction of the flap, a very ample substitute for the lower eyelid was afforded at the time of the operation; but, as seen in the second sketch, the subsequent contraction of the parts has reduced the new eyelid very considerably, and left the appearance of *ectropium*. From the same cause, the new upper lip has been retracted above its proper level.

This contraction of the transplanted parts (both the shrinking of the flap which takes place immediately on its being dissected from its connections, and the subsequent contraction during and for some time after cicatrization) seems, indeed, one of the chief points to be kept in view in all such operations for the restoration of lost parts, so as to ensure an ultimately satisfactory result.

In attaching a flap of skin in its new situation in such operations, care must be taken that the deep and lateral connections of its neck are so freely divided as to leave the least possible amount of twisting or constriction of the neck, the narrowness of the neck being, I believe, generally a less source of danger to the vitality of the flap than its being too much stretched or constricted.

After attaching the transplanted parts by sutures in their new situation, in many cases no advantage seems to be derived from close approximation of the edges of the cut surface, from which the flap of skin has been dissected. When this can be effected without undue stretching of the transposed parts, the cure will be expedited by attaching the edges of the wound to each other by sutures; but, when this is done at the expense of stretching the transplanted parts and causing them to drag on the sutures, which attach them in their new situation, it is productive of harm, by tending to prevent the primary union, on which the success of the operation depends.

The parts should be united in their new situation, as far as possible, by the twisted suture, and the time of the removal of the needles must be determined partly by the progress of the wound, but chiefly by the amount of stretching to which the parts are subjected. If the parts are lax, the needles may generally be removed with safety on the fourth or fifth day, the union being supported by the application of strips of adhesive plaster. But if the parts are at all stretched, the needles should be left for two or three days longer; the trifling marks which they produce being of less moment than the risk of the separation of the edges of the wound, which is incurred by the too early removal of the needles.

In the above case, and in the case of restoration of the upper lip, which I formerly noticed, the incisions required to effect the end in view have been extensive, and the operations necessarily of a severe nature. It must be remembered, however, that the operations were performed whilst the patients were under the full influence of chloroform, and, in both cases, at the urgent request of the patient.

The deformity, in each case, was such as appeared to me to justify any attempt to ameliorate the distressing condition of the patient. In the first case, the result has, I think, proved as satisfactory as could have been expected. In the present case, the result has hitherto proved equally gratifying, and, with the future addition of a nose to the present features, the improvement in the appearance of the girl will, I think, fully justify the measures which have been adopted.

#### *Cases of Urinary Calculus.*

Of the cases of stone in the bladder, in which I have performed the operation of lithotomy, the two following, which have lately occurred in hospital practice, are of peculiar interest:—

##### *CASE I.—Five Calculi removed by Lithotomy, each containing a Field Bean for its Nucleus.*

David Smeaton, a labourer from the county of Kinross, æt. 46, admitted into the hospital, September 17. 1851, suffering from the usual symptoms of vesical

calculus, which had been more or less urgent for six months previously. On examination with a sound, the presence of one or more calculi was easily detected.

The history of the origin of his symptoms was very imperfectly obtained at the time of his admission into the hospital, but on a more strict investigation after his recovery from the operation, the following account was obtained, which, I have reason to know, may be relied on.

About the end of March of the present year, after a carousal with two fellow labourers, with whom he lodged in a barn attached to his master's farm, a quarrel arose, in which he was knocked down and overpowered by his two companions. From the injuries he received, and from his state of intoxication, he was rendered senseless, and, whilst he was in this condition, the following cruel trick was perpetrated on him by his assailants:—

He was stripped of his clothes, and a quantity of beans (the common field or horse-beans used for feeding cattle) were thrust into his mouth and into the rectum; and lastly, several were introduced into his urethra. The manner in which these found their way into the bladder is unknown, but it is probable that several were introduced, one after another, into the orifice of the urethra, and then pushed back along the canal by the pressure of the fingers on the penis and perineum.

On the following morning he was found in a state of insensibility, with his genital organs covered with blood. His companions had made off, and have ever since escaped detection.

A number of beans were vomited, and passed *per anum* on the day following the assault, and during this and the subsequent day he suffered great pain in voiding his urine, which was mixed with blood, and contained several fragments of broken beans.

He was confined to bed for some days, but at the end of a week he had nearly recovered from his injuries, and his urinary symptoms had considerably abated in severity.

From that time forward, however, he continued to suffer more or less severely from the usual symptoms of stone in the bladder, which, as I have already said, were well marked at the time of his admission into the hospital. He was then suffering from very frequent and painful micturition. His tongue was brown and dry in the centre, and red at the point; his pulse above 90; and he had the haggard and distressed look of a patient suffering from severe urinary irritation. His urine was pale-coloured, of low specific gravity (1005), and deposited mucus and the triple phosphates in large quantity.

Under the alternate use of alkalies and dilute nitric acid with infusion of pareira, restricted diet, regulation of the state of the bowels, and the occasional use of suppositories containing muriate of morphia, his symptoms were soon much mitigated. The urine rose in density to 1015–1020, and for some days before the performance of the operation his calls to void urine were not more frequent than four or five times in the course of twenty-four hours. From the irritation consequent on the introduction of an instrument into the bladder, and from my suspicion of the existence of more than one calculus, the case seemed more favourable for the operation of lithotomy than that of lithotrity.

The lateral operation was performed on the 13th of October, and five stones were removed. No difficulty occurred in the performance of the operation. The prismatic shape and uniform size of the calculi were remarked at the time as being curious, but the presence of a foreign body as a nucleus of each was not suspected till some days afterwards, when the stones and their nuclei having been deprived of their moisture by evaporation, a hard substance was felt and heard rattling loosely in the interior of each on shaking them in the hand.

On sections of the calculi being made, the nuclei (of the introduction of which the history has since been elicited) were revealed. The incrustation was entirely composed of the triple phosphates. The sections of the calculi are well represented in the annexed woodcuts.



The patient made a speedy recovery, and left the hospital in perfect health on the 27th of November,—the wound having been quite healed for ten days previously to his dismissal.



**CASE II.**—The following case was operated on some months ago, and is a good instance of the occasional absence of all urinary irritation attending the presence of a mulberry calculus in the bladder:—

James Love, æt. 17, a native of Edinburgh. Suffering at the time of his admission into the hospital from the usual symptoms of stone in the bladder. On examination with the sound a calculus was at once detected, which, from the roughness of its surface, and from the history of his complaints given by the patient, was believed to be of the mulberry kind.

He stated that, when a child of scarcely three years old, he had suffered from frequent and painful micturition, and that these symptoms had at that time been found to depend on the presence of a stone in the bladder, which was repeatedly felt on the introduction of an instrument. The operation for its removal, however, was, for some reason, deferred, and presently his symptoms began to abate, and after a time entirely disappeared.

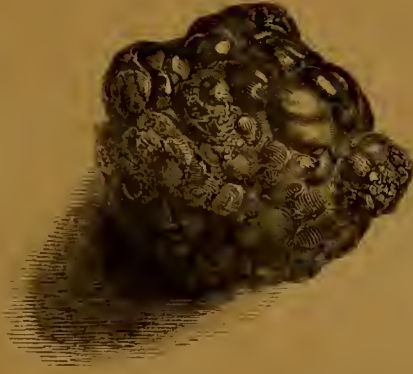
From this time forwards he continued to enjoy excellent health, and never suffered the slightest uneasiness in making water, nor had he the least suspicion of the existence of any urinary affection till about three months before his admission into the hospital (fourteen years after the presence of a calculus had been detected). About that time he contracted gonorrhœa, which yielded to treatment, but was followed by the usual symptoms of vesical calculus. These symptoms he believed to depend on stricture of the urethra, for the cure of which disease he applied to be admitted into the Infirmary.

On his admission into the hospital, his condition appeared to be in every way favourable for the immediate removal of the stone. The lateral operation was accordingly performed on the following day. No difficulty presented itself in the performance of the operation. The calculus, which weighed a little more than an ounce, proved to be of the mulberry formation, but the oxalate of lime was loosely encrusted with a layer of triple phosphates, which had evidently been deposited during the previous three months, the period during which the symptoms of irritation had been present.

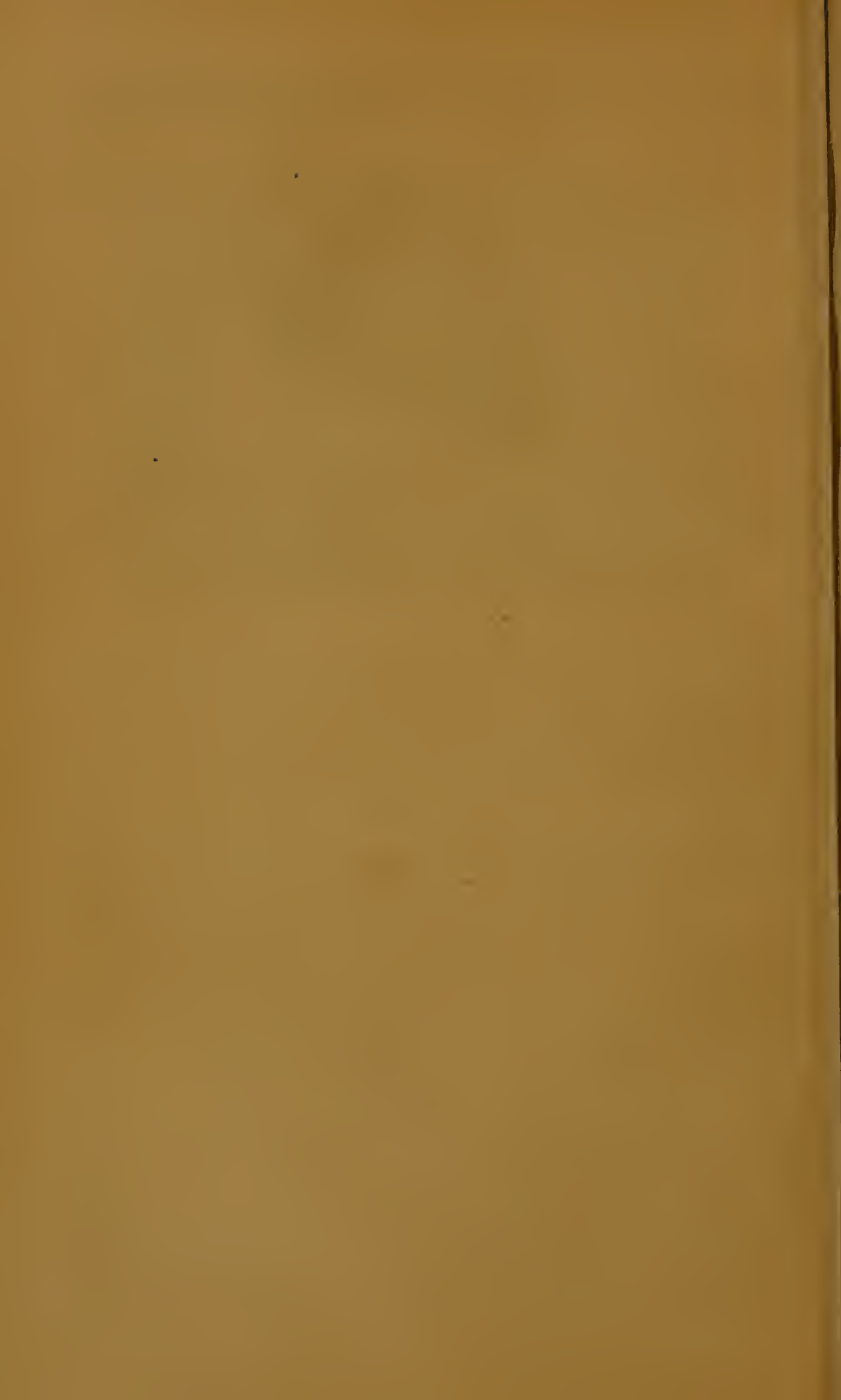
On the phosphatic layer being rubbed off with the finger, the calculus, as seen



in the woodcut, presented the usual dark-brown colour and appearance of the mulberry stone, the nodules on its surface being smooth and polished from the long-continued friction to which they had been subjected.



The patient made an excellent recovery, and left the hospital in good health about four weeks after the performance of the operation.



# REPORT OF SURGICAL CASES

OCCURRING IN HOSPITAL PRACTICE.

BY

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[FROM THE MONTHLY JOURNAL OF MEDICAL SCIENCE FOR MARCH 1852.]

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## *On the Use of Chloroform in the Treatment of Stricture of the Urethra with Retention of Urine.*

In the treatment of ordinary stricture of the urethra, the use of chloroform is not called for. On the contrary, its employment, where no unusual irritability of the urethra exists, must evidently be attended with disadvantage, as the feelings of the patient form, to a certain extent, a guide to the surgeon in passing the instrument through the constricted part of the canal.

It is in the irritable form of stricture, accompanied with spasmodic contraction of the muscular fibres surrounding the urethra, that advantage is occasionally derived from the use of chloroform. Cases of this kind occur, where, every now and then, during the treatment by dilatation, the progress of cure is checked for a time,—a bougie of small size is tightly grasped in the stricture, which a day or two previously easily admitted a larger instrument. This difficulty appears to be caused by spasm of the muscular fibres surrounding the canal; and it is in such cases that the use of chloroform decidedly facilitates the introduction of instruments.

But it is when retention of urine occurs in cases of this kind, that the advantage of chloroform is more prominently marked, and of which, I think, the simple details of the following case give undeniable proof:—

James Pentland, æt. 23, admitted into the hospital October 19, 1851, on account of stricture, with retention of urine. He stated, that for the last four years he had served in an infantry regiment, during the greater part of which time he had suffered from stricture of the urethra, on account of which he had been discharged, as unfit for military duty, a few months previously to the date of his admission into the hospital. He had repeatedly, whilst in the army, suffered from retention of urine, which had been relieved occasionally with great difficulty, and with very small-sized catheters, at other times with instruments of larger size.

During the last month, his difficulty in making water has increased; and on the day before his admission, he again suffered from retention, and the surgeon under whose care he had latterly been, and who had, on various occasions

passed instruments into his bladder, failed in introducing a catheter. The patient was then sent to the hospital, where, after a good deal of difficulty, I succeeded in passing a small catheter (No. 2) into the bladder, and removed a large quantity of urine. The catheter was tightly grasped, and an induration was felt by the finger at the seat of stricture—the bulb. The catheter was retained in the bladder for two days, when it was withdrawn, and he was able to pass his water easily in a small stream.

On the 24th, at the hour of visit, I found him again suffering from retention. A large quantity of urine had accumulated, the bladder forming a prominent tumour, which reached nearly as high as the umbilicus. On attempting to introduce a catheter, I found I was unable to pass the smallest sized instrument through the stricture. No. 1 was passed within the constricted part of the canal so far that it could not be withdrawn without using a considerable degree of force; but, after repeated trials, I was foiled in reaching the bladder.

Under these circumstances, I was about to request the assistance of Mr Syme, who was in the hospital at the time, when it occurred to me that the case was a good one to test the existence of muscular spasm by the use of chloroform. After inhaling the vapour for a few seconds, the patient became much excited, and struggled a good deal; but no sooner had the stage of excitement passed off, and the relaxed state of the muscles and stertorous breathing evinced the full action of the anæsthetic, than *the urine was expelled in a forcible and continuous stream* by the side of the small catheter, the point of which I had retained within the constricted part of the canal. I immediately withdrew the catheter, which now lay loosely within the canal, and at once passed No. 2 into the bladder with perfect ease.

After emptying the bladder, and before withdrawing the catheter, I requested one or two of the gentlemen who were present, and who had felt the tightness with which the smallest instrument had been grasped, to satisfy themselves that the larger catheter now lay loosely in the canal. I believe, indeed, that Nos. 4 or 5 might now have been passed as easily as No. 2.

No further difficulty occurred in the treatment of the case. The contraction of the canal was overcome by gradual dilatation, and the employment of chloroform was not again required. On the 27th, No. 2 only could be passed. On the 29th, Nos. 2 and 3. On the 1st of December, the patient was dismissed from the hospital, No. 16 having been passed two or three times before his dismissal. He returned to the hospital two or three times afterwards, when my house-surgeon, Mr Moir, found no difficulty in passing the largest sized bougie. His urine was passed in a full stream, and his former symptoms were entirely relieved.

In recording this case, it is not my wish to advocate the employment of chloroform as a general rule, even in those cases of stricture where considerable irritability of the urethra exists; but to call attention to the distinct proof of the constriction in this case being much increased by muscular spasm, and of this being at once relieved by the action of chloroform, as well as to the fact, that the bladder retained its expulsive power, whilst the retentive muscular fibres were relaxed.

The involuntary evacuation of the bladder is a frequent effect of the inhalation of chloroform, which is not difficult of explanation. The tendency of the bladder to contract, when moderately distended with urine, is resisted, whilst the individual retains his senses, by an effort of the will, by the contraction of voluntary muscular fibres. Under the full influence of chloroform, the voluntary muscles are paralysed, but the involuntary muscles retain (unless the inhalation is carried to a poisonous extent) their contractile power. The muscular movements of respiration and circulation continue. The contractions of the uterus in parturition are only partially, if at all, impaired; the bladder in the same way retains its expulsive power. In the operation of lithotomy, we see the urine expelled through the opening in the neck of the bladder with the same force when the patient is in a state of complete anæsthesia, as when chlo-



roform has not been inhaled. The organ, though deprived of sensation by the action of the chloroform, retains its sensibility to its natural stimulus, and retains, at the same time, its contractile power. The muscular fibres, which, in a state of health, resist, through an effort of the will, the expulsion of the urine, are, in irritable stricture, spasmodically contracted. The spasm is relieved by the action of the chloroform, and the resistance to the flow of urine being thus removed, the bladder expels its contents.

Professor Simpson has kindly furnished me with the notes of a similar case, which occurred in the practice of Mr Creeke, of Leven, whose account of the case is as follows :—

“ A young sailor, robust and active, aged 25, applied to me, September 14, 1851, not having voided urine for twenty hours. He has had a stricture for some years, and had a very small catheter introduced in Bombay about eighteen months ago. He had not much difficulty in making water during his voyage from India, and has lived rather freely since his return home.

“ Finding all attempts at introducing a catheter useless, I proposed to administer chloroform, but to this he demurred so strongly as to induce me to consult my friend Dr George Forbes, of Keunoway, who also attempted the introduction of the catheter without success. The administration of chloroform was again proposed, and, as he was suffering considerably from distension of the bladder, he consented. The chloroform vapour was then inhaled for about a minute, when he exclaimed, ‘ I’m all right now ! ’ In fact, he was passing urine quite freely (allowing for the organic lesion before spoken of). I kept up the action of the chloroform slightly, and he emptied the bladder to his astonishment and great relief.”

The account of these cases proves, I think, the value of chloroform as an auxiliary to the introduction of the catheter, or even as a means itself of relieving the distended bladder. It acts in the same manner as the warm bath, but much more speedily and effectually. Without its employment, I think it is not improbable that in both the above cases it would have been necessary to have opened the urethra from the perineum, or to have punctured the bladder.

#### *Rupture of Urethra, with Extravasation of Urine.*

William Cochrane, a stable-boy, æt. 14, was admitted into the hospital early on the morning of January 29, 1851, on account of an injury of the perineum, sustained about four o’clock on the previous afternoon, of which he gave the following account :—In trying to walk along the top of a paling, he missed his foot, and fell astride the fence, the entire violence of the fall being sustained on the perineum; he then fell sideways to the ground, where he lay for two or three minutes, sickened by the pain and shock of the injury. He immediately afterwards perceived a swelling in the perineum, but, as the pain soon passed off, he took little further notice of it, and went on an errand, and returned home, walking a distance of a mile with little discomfort or inconvenience. He then took his supper of porridge and milk, and afterwards tried to make water, but found he was unable to do so. During the night his desire to make water became more urgent, and after several ineffectual attempts to empty his bladder, he applied for surgical assistance. A catheter was introduced, but its point was arrested in the perineum, and a few drops of blood only passed through the instrument. No palpable signs of distension of the bladder, nor of extravasation of urine, existed at this time. He was immediately sent to the hospital, where he arrived about six o’clock A.M., after a journey of five miles in a cart. I saw him shortly afterwards, and found him in a very distressing condition. The bladder, distended with urine, formed a tense and projecting tumour, which reached as high as the umbilicus; the perineum was distended to an extent which I had never previously witnessed; and the scrotum, infiltrated with blood, formed a round tense tumour, of a nearly black colour. The discoloration and swelling extended along the groins and over a considerable

part of the abdomen. The surface of the body was cold, the pulse small and very rapid, and the features were sunk and expressive of great suffering.

Chloroform having been administered, the boy was placed on a table in the position for lithotomy. The left forefinger having been introduced into the rectum, a bistoury was thrust with its edge forwards deeply into the swollen perineum immediately in front of the anus, and carried forwards in the central line as far as the scrotum. A quantity of bloody urine and some coagula were discharged by the incision, but little or no bleeding took place. The lacerated cavity was then cleared of coagula with a sponge, and a catheter was introduced along the urethra from before, its point passing through the ruptured urethra into the wound about an inch behind the scrotum. On separating the edges of the posterior part of the wound, the urine was now easily seen flowing from the orifice in the membranous portion of the canal (the point at which the rupture had taken place). The orifices of the divided urethra had been separated by the extravasation to a distance of between two and three inches. The point of the catheter was then introduced into the posterior orifice, and carried onwards to the bladder. The scrotum was next freely incised, and the catheter, after the bladder was emptied, fastened in the usual way.

The boy was immediately removed to bed, and hot bottles placed around him. After taking a little wine, he rallied speedily from his collapsed condition. An opiate was given, and in half an hour after the performance of the operation, he had fallen into a sound sleep.

Six hours afterwards, the swelling of the perineum and scrotum had nearly entirely subsided, and the gaping wounds were reduced to about a third of their original size. The fulness of the groins and lower part of the abdomen, in which parts no incision had been made, had, too, quite disappeared.

The febrile excitement which followed was very trifling, and had entirely subsided at the end of three or four days. The catheter was withdrawn on the 1st of February, and for three days afterwards the urine passed entirely through the perineal wound. After this, the quantity passed by the natural channel gradually increased, but a few drops occasionally passed through the perineum till so late as six weeks after the performance of the operation.

On the 18th of February, a bougie of as large a size as the orifice of the urethra would admit (No. 6), was passed into the bladder, and was introduced daily after this as long as he remained in the hospital.

He left the hospital on the 19th of April in good health, the wound having been entirely healed for about a month previously.

Before he left the hospital he was taught to pass a bougie into the bladder, and was directed to introduce No. 5 every second day. He returned about the middle of July, suffering from retention of urine, having omitted to use his bougie for about a week. No. 3 catheter was with difficulty introduced, and the urethra was again gradually dilated to its normal size in the course of a few days.

Since that time he has continued to introduce a bougie regularly, but still (February 1852) finds that he has difficulty in making water if he neglects the use of the bougie for more than a week.

### *Rupture of Urethra.*

Samuel M'Donald, æt. 17, a groom, admitted May 12th, 1851, on account of retention of urine from injury of the perineum. He states that three days ago, while on horseback, the horse started, and he was thrown sharply forwards on the pommel of the saddle. He immediately experienced severe pain in the perineum; blood flowed from the urethra, and on his attempting to void urine a short time afterwards, he found he was unable to do so. He immediately applied for surgical assistance, and Mr Maedonald of Leith succeeded, after some difficulty, in introducing a catheter into the bladder. The urine which was drawn off was dark coloured, and mixed with blood.

Considerable swelling of the perineum ensued during the next two days, and as the catheter was passed with difficulty, he was sent to be under my care in the hospital.

On his admission, there was ecchymosis and a hard and painful circumscribed swelling of some size immediately behind the scrotum. On introducing a No. 6 catheter, it was arrested before it reached the bulb, and after a little trouble was passed on to the bladder, and the urine drawn off. The catheter was withdrawn; fomentations were applied to the perineum, and he was directed not to attempt to make water. The catheter to be passed three times a-day.

The difficulty in passing the catheter diminished from day to day, and the swelling in the perineum gradually subsided.

On the 15th, he passed his urine without difficulty, but with some smarting along the urethra. From this time he continued to make water in a small stream, but without difficulty. To prevent the contraction of the urethra, bougies were passed daily, but contraction had already so far taken place; and before his leaving the hospital on the 27th, the urethra would not admit a larger instrument than No. 7.

He was directed to return to the hospital, to have an instrument passed, every second or third day. He returned for this purpose for about ten days, when Mr Moir passed Nos. 6 and 7; but at the end of that time, feeling himself very well, he discontinued his visits.

*February 15th, 1852.*—Mr Moir tells me that he visited this patient two days ago, and that, on examining his urethra, he found that he could with difficulty pass No. 3 bougie. The patient is suffering from increasing symptoms of stricture.

These cases present excellent examples of the usual effects of severe blows on the perineum. Their history, too, indicates the treatment which should be followed, according to the degree of the injury, and according to the symptoms which are produced by its effects.

In the first case, the violence which caused the rupture of the urethra was very great; but as long as the urine did not escape into the cellular tissue of the perineum, the boy suffered but little pain or inconvenience. He walked the distance of a mile, took his supper as heartily as usual, and then went to bed and fell asleep. It was only after repeated ineffectual attempts to make water, ten hours after the receipt of the injury, that he became uneasy as to the consequences of his fall. Dr Balfour, of Cramond, under whose care he was, informs me that at this time there were no signs of extravasation of urine in the perineum, nor of distension of the bladder. He drank freely, however, during the night; and before he arrived at the hospital, the urine had accumulated rapidly in the bladder, and had escaped in large quantity into the cellular tissue through the breach in the urethra.

It is probable that in cases of this kind the bladder is more or less paralysed by the blow, and, in addition, that the lacerated orifice of the urethra is obstructed by the swelling of the parts and the extravasated blood, which are the consequence of the injury. Such impediments to the flow of the urine can alone tend to prevent the extravasation of urine, which otherwise must necessarily occur on the patient attempting to empty the bladder after such an injury. As the bladder becomes distended, the mechanical pressure of the urine must soon overcome the temporary obstruction to its escape, and the urine is forced into the perineum.

In the case of Macdonald, it is probable that extravasation of urine was prevented at first by the same cause. He attempted, a short time after the occurrence of the accident, to make water, but finding that he was unable to do so, he immediately applied for surgical assistance, and a catheter was passed into the bladder. The absence of extravasation of urine in this case indicates the advantage of immediate interference after such injuries. The escape of blood by the orifice of the urethra, and the ragged state of the canal felt on introducing the catheter, were sufficient proof of laceration of the urethra having taken place.



The treatment which was adopted in the first case requires little comment ; the strongly marked signs of infiltration of urine showed clearly what was required to be done. The only doubtful point, was the necessity of incising the integuments of the groins and abdomen, into which parts the extravasation had extended. This was delayed, as a free outlet was given to the urine by the incisions in the scrotum, and as the boy was in such a prostrated state, that even a trifling loss of blood was to be avoided. The rapid subsidence of the swelling in these parts, however, following the incisions in the perineum and scrotum, rendered further division of the integuments unnecessary.

No sloughing of the cellular tissue followed the urinary infiltration in this case ; on the contrary, the wounds assumed a healthy appearance very speedily, a circumstance which is to be accounted for by the urine being but slightly acrid in so young a subject, and by its having been rendered still less so by the boy having drunk a large quantity of water after the receipt of the injury, as well as to the extravasated fluid having been evacuated freely, and before it had remained long within the tissues.

The catheter, after being introduced, was retained within the bladder, as is usually done after such operations, for about three days, so as to prevent obstruction of the torn orifices of the urethra, and to keep their edges as far as possible in apposition.

In the case of Macdonald, the catheter was not retained within the bladder. Had great difficulty been experienced in introducing the instrument, it might have been advisable, as a precautionary measure, not to have withdrawn it. I believe, however, that it is better in cases of the kind where an instrument can be introduced with tolerable facility, to withdraw the catheter after emptying the bladder, and to introduce it two or three times in the twenty-four hours, giving the patient strict injunctions to refrain from all attempts at micturition. When a catheter is retained in the bladder, a small quantity of urine always escapes by its sides, and might thus give rise to infiltration of the tissues through the breach in the walls of the urethra.

Stricture of the urethra, the inevitable consequence of such injuries if not carefully attended to for a long period, occurred in both these cases. In the first, the more severe injury, the contraction of the canal is easily obviated by the regular introduction of a bougie. In the second, the neglect, on the part of the patient, of this precautionary measure, has already led to the formation of a tight stricture at the seat of injury.

The tendency to contraction under such circumstances seems to continue for a very long period. Cases of obstinate stricture are of common occurrence, in which the disease has owed its origin to an injury received many years previously. Mr Liston mentions one case, in which extravasation of urine had occurred and the perineum had been incised, and in which the tendency to contraction continued eight or ten years afterwards.<sup>1</sup>

<sup>1</sup> Practical Surgery, 4th Edition, p. 466







# REPORT OF SURGICAL CASES

OCCURRING IN HOSPITAL PRACTICE.

BY

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## *Arterial Hemorrhage.*

No rules in surgery have been more insisted upon than those which are to guide the surgeon in the treatment of hemorrhage from a wounded arterial trunk. The valuable precepts on this subject, inculcated by John Bell in the beginning of the present century, have been more recently confirmed and more strongly urged on the attention of the profession by the writings of Mr Guthrie, who has collected from all quarters a sufficient number of cases to form an invaluable work of reference on the subject.<sup>1</sup>

Distinctly, however, as the principles of treatment have been stated by these and other surgical writers, in no cases in surgery do we find that established rules are more frequently departed from in practice than in those of bleeding from arterial trunks.

The rule, that a bleeding artery is to be exposed, and a ligature placed on each side of the bleeding point, is frequently set aside, and the Hunterian operation as for aneurism (the application of a single ligature to the artery, at some distance on the cardiac side of the bleeding point) resorted to. Such a proceeding is frequently followed by permanent suppression of the hemorrhage, and such cases, being from time to time recorded, give confidence in a plan of treatment, which is at best uncertain in its results, while they tend to render apparently doubtful the necessity for resorting to the more embarrassing and arduous operation, so strongly enforced by the authors I have mentioned, of applying ligatures above and below the bleeding point of the vessel.

That exceptions occur, in which the surgeon is compelled to trust to the Hunterian operation as the only means of arresting the hemorrhage, no practical surgeon can doubt; and what appears most desirable at present is, that rules

<sup>1</sup> Guthrie on Wounds and Injuries of Arteries. Reprinted from *Lancet*, 1846.

should be laid down by surgical writers, establishing as nearly as possible the circumstances in which the surgeon is justified in departing from the normal operation, and resorting to the uncertain means of arresting the bleeding by applying a single ligature to the artery at a greater or less distance on the cardiac side of the wounded point.

The two principal conditions which forbid the operation of exposing and tying the vessel at the wounded point appear to be,—1st, where it is impracticable, or where the extent of wound necessary to expose the bleeding point would be so great as to render such a proceeding unjustifiable; and, 2d, where the artery is so disorganised at the part from which the hemorrhage proceeds as to render it incapable of assuming the healthy changes necessary for the safe separation of the ligatures.

As instances of the first of these conditions, may be mentioned wounds of the internal carotid from the fauces, punctured wounds of either branch of the carotid in the upper part of the neck, punctured wounds of the femoral artery between its entrance into the sheath of the adductor magnus and the popliteal space, or of the anterior tibial as it passes through the interosseous ligament.

In the first, and perhaps in the last of these instances, the operation may be said to be impracticable; in the third, the depth of the wounded vessel would necessitate such extensive division of parts as to render the operation unjustifiable, and in the case of a wound of one of the divisions of the carotid near the angle of the jaw, the impossibility of commanding the hemorrhage during the operation must render the exposure of the wounded vessel a most embarrassing proceeding, and one likely to fail in the hands of the most skilful operator.

The practice which, I presume, would be followed by most surgeons under such circumstances would be, in the first place, the accurate closure of the edges of the small wound in the integuments, and the application of firm pressure, by means of a compress of lint over it, so as to obtain union of the external wound, and to favour the possible closure of the breach in the arterial coats; and the subsequent application (in the event of the formation of aneurism) of a single ligature to the artery on the cardiac side of the seat of injury.

Exception may be taken, perhaps, to this practice in some of the instances I have cited; but it is the practice which, I believe, as a general rule, must be followed in such cases.

It would be a more difficult matter to lay down rules which are to guide the surgeon as to the second condition, as to the capability of the artery to bear the application of ligatures, when its coats are in a morbid condition as a result of injury or disease.

In cases of gunshot wounds of arteries, we have the authority of Mr Guthrie and other military writers, to prove, that the artery in the close vicinity of the contused wound made by the ball, is in a condition in which ligatures may be applied to it with safety. In secondary hemorrhage after amputation, it has been proved in numerous instances that the opening up of the stump, and the application of a ligature at a very short distance above the ulcerated opening in the bleeding artery, is the safe and proper practice, and generally succeeds in permanently arresting the hemorrhage.

Many cases, however, occur in which the ordinary rules of practice must be departed from, and the publication of all cases, successful and unsuccessful, bearing on the question, seems desirable, as establishing *data* from which practical rules may be deduced.

#### *Hemorrhage from an Ulcerated Opening of the Popliteal Artery— Ligature of Femoral Artery.*

Charles Macqueen, æt. 18, was admitted into the Royal Infirmary, under Mr Syme's care, March 7, 1842, on account of a deep-seated abscess in the popliteal space. Mr Syme opened the abscess, and on introducing the finger into the opening, the matter was found to have separated the vessels from the bone. the



artery being felt bare and exposed to the extent of an inch and a half superficial to the finger.

Unhealthily ulceration followed the opening of the abscess, and the patient being very anxious to return home, he was permitted to leave the hospital.

I received an urgent message to see him immediately on the 31st, as he had suddenly lost a large quantity of blood from the opening in the ham. On arriving at his house, I found him much exhausted from the loss of about three pounds of blood. The hemorrhage had been arrested by my friend Dr Cleg-horn, whom I found compressing the femoral artery in the groin. On introducing my finger into the opening in the popliteal space, and clearing the cavity of the coagula which it contained, I found it was impossible to distinguish one tissue from another, the entire soft parts, forming the deep wall of the cavity, being in a sloughing condition.

Relaxation of the pressure in the groin instantly renewed the hemorrhage, the blood escaping through the disorganised tissues at various points.

Compression being made in the middle of the thigh, I exposed and placed a ligature around the superficial femoral artery in the usual situation above the crossing of the sartorius muscle. The bleeding was at once arrested, but the patient, exhausted by the great loss of blood which had taken place before the vessel was tied, sank, and died twenty-four hours after the operation. There was no renewal of the bleeding subsequently to the application of the ligature.

In this case there seemed no choice as to the practice which was to be pursued. The application of ligatures near the bleeding point was clearly inadmissible, the artery being imbedded in sloughing tissues, and its coats being already partly disorganised. The ligature of the femoral artery at once arrested the hemorrhage, and, had the patient survived, might have proved effectual in arresting it permanently. In the event of the patient having rallied, and of the hemorrhage having been renewed through the collateral circulation, amputation would have been performed.

Some years ago, I published the details of a case, in which the application of a ligature to the subclavian artery was successful in permanently arresting hemorrhage from the axillary artery, in a scorched wound made by the thrust of a red-hot poker.<sup>1</sup>

The condition of the artery in this case was very similar to that of the popliteal artery in the case I have just related. It was largely exposed at the bottom of a foul sloughing sore, in the midst of which its coats had been disorganised and perforated.

As the practice pursued in this case has been made the subject of comment by Mr Guthrie,<sup>2</sup> and as I still believe that the performance of the operation which was resorted to was as correct in principle as it proved successful in practice, I shall here take the liberty of answering the objections brought forward by Mr Guthrie to the treatment which was followed.

The arterial hemorrhage first occurred in this case eight days after the receipt of the injury, during the sloughing which followed a deep cauterised wound in the hollow of the axilla. The patient had already lost a large quantity of blood before I saw him. On removing the dressing which had been applied, no bleeding occurred; and, as I was uncertain whether the hemorrhage had occurred from the main trunk, or from one or more of its branches, a compress was applied firmly to the bottom of the wound, and supported by a bandage.

On the following day, the uneasiness caused by the tightness of the bandage induced the patient to loosen the dressings, when the hemorrhage recurred so suddenly, and with such violence, as to leave no doubt as to the main artery being its source.

The patient was now much exhausted from loss of blood, and a recurrence of the hemorrhage to any extent would probably have proved at once fatal.

<sup>1</sup> Northern Journal of Medicine, March 1846.

<sup>2</sup> Guthrie on Wounds and Injuries of Arteries, p. 49.

A ligature was applied to the subelavian artery, by which the hemorrhage was permanently suppressed. The wound in the axilla speedily assumed a healthy action, and the patient made a perfect recovery.

This case appears to me a good illustration of the conditions in which the ordinary rule of applying ligatures on each side of the wounded point must be departed from.

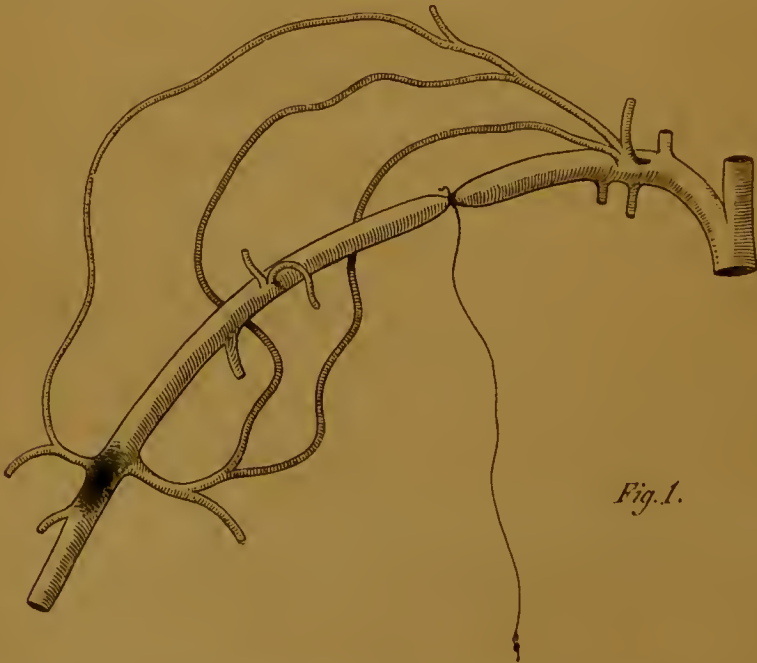
The artery, exposed and bleeding in the midst of sloughing tissues, itself disorganised, was in no condition to bear the application of ligatures.

But Mr Guthrie does not admit the disorganised state of the artery as any reason for deviating from the ordinary rule of practice, and strongly censures the treatment which was pursued. The vessel should, in Mr Guthrie's opinion, have been exposed at the bleeding point, by cutting across the pectoral muscle, and laying bare the whole cavity of the axilla, and ligatures applied to the artery where its coats appeared sound above and below the opening.

The first objection which presented itself to this proceeding was the fact, that the patient was already much exhausted by loss of blood, and the hemorrhage which must necessarily have occurred in such an operation, however dexterously performed, would not improbably have been attended by fatal consequences.

In the second place, the artery was in an unsound condition in the vicinity of the bleeding point, the ligatures consequently, to have embraced sound parts of the vessel, must have been applied at some distance above and below the opening; and, from the situation of the bleeding point, the large collateral branches would probably have communicated with the artery in the space included between the ligatures, rendering the risk of a recurrence of the hemorrhage as great as after the single ligature of the subelavian.

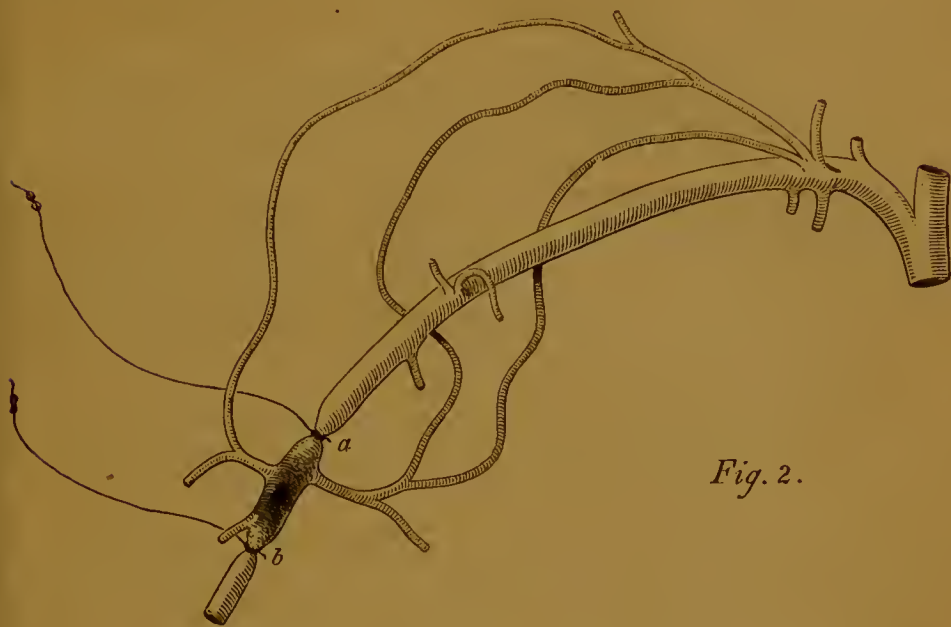
The accompanying rude diagrams of the artery, and its chief inosculating branches, will render this more intelligible.



*Fig. 1.*

The opening in the artery was, as nearly as we could judge, in the situation here represented, in the close vicinity of the subscapular and posterior circumflex branches. The ligature of the subelavian artery (as shown in the first diagram) certainly left these vessels free to renew the current in the axillary artery, and the risk of a recurrence of the hemorrhage was thus incurred.

But this risk would have been equally hazarded by the other operation, if the situation of the bleeding point was correctly estimated.



*Fig. 2.*

The ligatures must, as far as could be ascertained, have been placed (as shown in the second diagram at *a* and *b*), so that the large inosculating branches would have poured their blood into the artery between them.

An additional risk of gangrene of the limb would likewise have been incurred by the extensive incision through the anterior fold of the armpit, in which other collateral branches would necessarily have been divided and tied; and, lastly, it was necessary, in the circumstances of the case, to take into consideration the permanent maiming of the right arm, which must have been the consequence of division of the pectoral muscle.

These considerations appear to warrant the conclusion, that the practice followed in this case was correct, whilst, at the same time, they do not tend to invalidate the principles of treatment, which have been so strongly insisted on by Mr Guthrie, as applicable in cases of simple wounds.

In the event of the bleeding having recurred in the above case after the ligature of the subclavian artery, amputation at the shoulder-joint would have been resorted to. By making a large flap on the outer side of the shoulder, and carrying the knife directly downwards from the joint through the axilla, the vessel would have been divided near the injured point, and, if necessary, it would then have been easily exposed at a higher point and tied.

*Rupture of an Aneurism of the upper part of the Posterior Tibial Artery; Aneurism laid open, and the Artery secured by Ligatures above and below the Opening in its Coats.*

J. M., æt. 35, a letter-carrier, who had been, for some months previously to my seeing him (September 1, 1847), under the care of Dr Burn, on account of a prolonged attack of acute rheumatism, had suffered, during his recovery, from numbness and cramp of both feet, occasioned apparently by a hard and painful swelling in the upper part of the calf of each leg. The swelling in the left limb slowly increased in size, whilst that in the right remained stationary. The patient never experienced any feeling of pulsation in either tumour; and I am



informed by Mr Spence, who saw the case in consultation with Dr Burn, that no pulsation could ever be detected in the tumour of the left limb. The tumour having continued to increase slowly in size for upwards of two months, and the sufferings of the patient becoming more severe, it was deemed expedient to make a small opening at the lower part of the swelling. No satisfactory information, however, was elicited by the puncture, a small quantity of dark-coloured blood only escaping from the opening. A small quantity of pus was discharged from this opening for a few days, when, on the night of the 31st of August, a sudden gush of florid blood from the opening disclosed the hitherto obscure nature of the case.

In the absence of Mr Spence from Edinburgh, I was sent for, and found that, although the hemorrhage had been arrested by Dr Burn, a large quantity of blood (upwards apparently of two pounds) had been lost before his assistance had been procured. I found the limb enormously distended from the ham to within five or six inches of the ankle. Stimulants had been freely administered, but the patient was in a state of extreme depression, the cold surface of the body, his contracted features, laboured respiration, and whispering voice, giving evidence that the powers of life were nearly exhausted.

No pulsation could be detected in the swelling, or in the posterior tibial at the ankle. The opening, from which the bleeding had taken place, was situated at the lower part of the calf of the leg, about the junction of the muscular and tendinous portions of the gastrocnemius.

In consulting with Dr Burn as to what was to be done, it was evident that one of two courses must immediately be adopted,—the application of a ligature to the femoral artery, or the laying open of the aneurismal swelling, and the application of ligatures to the artery above and below the breach in its coats.

The following considerations show the difficulty of deciding, under such circumstances, as to which operation should be had recourse to. Ligature of the femoral artery would, in all probability, have entirely arrested the hemorrhage for the time, but suppuration of the enormous cavity must have followed, and a free exit must have been given for the pus and coagula which it contained; a free communication would thus have been established between the breach in the artery and the surface of the body, and the collateral circulation must almost of necessity have renewed the bleeding in a few days. The condition, as regarded the risk of hemorrhage, was similar to that of a wounded artery; but with this difference, that the wound communicating with the artery could not be closed, and the slightest current passing through the vessel must have renewed the hemorrhage.

Again, the laying open of the tumour, and the ligature of the artery at the bleeding point, independently of its being a very serious operation under the circumstances, would have been attended by all the danger of the old operation for spontaneous aneurism, the danger of secondary hemorrhage from the application of ligatures to a diseased artery. Mr Guthrie, in one of his *precepts* on the subject of arterial bleeding, says, "When a circumscribed or diffused aneurism, which has formed after a wound, has been opened, whether by accident or design, it is placed in the situation of a wounded artery, and should be treated as such. If the aneurism has arisen from disease of the vessel, and the wound or opening into it cannot be permanently closed, the limb is in a worse state than if the artery had been wounded by accident, because a ligature or ligatures placed on a diseased artery are little likely to be successful. They are liable to all the difficulties and inconveniences attendant on the old operation for aneurism."

Fortunately, as it turned out for the patient, he was not in a condition to bear the shock which would have been produced by amputation of the limb.—a proceeding which would probably have been adopted, had his exhausted condition not rendered such a measure hopeless.

The old operation was performed: the femoral artery having been compressed by the application of a tourniquet, the aneurismal swelling was laid freely open, and the large cavity cleared of the coagulated blood which distended it; a hard



tumour, of the shape and size of an orange, was thus brought into view, within a short distance of the ham, adhering firmly to the surrounding textures. It was easily recognised as the fibrinous mass which had formed within the aneurism, before it had become diffused.

On tearing away this mass of fibrine, the posterior tibial artery was brought into view; and on slackening the tourniquet the blood issued from a small oval-shaped opening on its posterior surface. The opening was abrupt and defined, and did not involve above a third part of the circumference of the artery. The artery was matted together with its accompanying veins and with its sheath, so that it was with difficulty separated, so as to allow of the passage of the aneurismal needle. The vessel having been securely tied immediately above and below the opening, the tourniquet was slackened, when I was astonished to find that the blood still issued, although with diminished force, through the opening. On looking for the cause of this, I discovered that the breach in the vessel was close to the origin of the peroneal artery, which opened into the posterior tibial between the ligatures. A third ligature was accordingly placed around the peroneal artery, by which the bleeding was completely arrested.

Some lint was placed in the cavity, and the limb was gently supported by a flannel bandage, applied from the toes to the knee. The patient rallied slowly from his sunk condition, and on the following day the limb had regained its temperature, and was greatly reduced in size. On the thirteenth and fourteenth days after the performance of the operation, the knots of the ligatures were seen in the discharge; no bleeding occurred, and everything went on well. He was able to be out of bed for some hours every day, in three weeks after the operation; the large cavity in the calf of the leg contracted slowly, and was entirely healed at the end of two months. His health gradually improved, and I found, on inquiring for him six months afterwards, that he had resumed his duties as a letter-carrier, which he still performs, in good health, and walking not less than twenty-five miles a day.

The swelling in the right limb remained stationary for some time after the operation, and then began to diminish in size, and ultimately disappeared. My attention was first directed to its presence by the patient about a fortnight after the operation, when it could be felt as a hard globular tumour beneath the belly of the gastrocnemius muscle. It had very much the character of a solidified aneurism, and its history rendered it not improbable that the tumour was of a similar character to that which had existed in the opposite limb.

Mr Syme mentions in one of his clinical lectures,<sup>1</sup> a case of false aneurism in the upper part of the leg, which occurred shortly before the case which I have related, and in which the opposite practice was necessarily followed; and as the case illustrates forcibly the danger of a recurrence of the hemorrhage, which is incurred by resorting to the Hunterian operation under such circumstances, I shall quote the case in Mr Syme's words:—

“A middle-aged woman, in a country town, while walking up a steep and slippery ascent, and carrying a knife with which she had just killed a pig, fell, and thrust the sharp point of the blade completely through her leg, a little below the knee, entering between the tibia and fibula, and issuing at the lower part of the popliteal space.

“Blood gushed from both openings, but, when she was laid in bed, ceased and did not return. At the end of a fortnight, the wounds having healed, she attempted to walk, and found that a swelling had taken place at the seat of injury, on account of which, by the advice of her medical attendant, she came here to be under my care. On examination, I found a large pulsating tumour in the fore part of the leg, immediately below the knee, and another of equal size in the popliteal cavity.

“Feeling unable to determine whether the anterior or posterior tibial, or the popliteal artery itself was the vessel wounded, and, on the whole, being inclined

<sup>1</sup> Monthly Journal of Medical Science. April 1851. P. 371.

to think that the one last mentioned was most probably concerned, in which case ligature of the femoral would be the proper course, I adopted this measure. No bad consequence followed the operation, the tumours ceased to pulsate, and favourable expectations were entertained of the result for two or three weeks, when the anterior wound below the knee opened and bled profusely."

The wound was then dilated, the false aneurism cleared of its coagula, and pressure applied on the bleeding point between the tibia and fibula. Mortification followed, and the limb was amputated.

I watched the progress of this case with much interest, as it appeared to me to be one of the few cases in which the ordinary operation of applying ligatures at the wounded point of the vessel, was impracticable. The result, as ascertained on dissection of the limb, proved it, I think, to be so. The wounded vessel was the anterior tibial just before it passed through the inter-osseous ligament, a point which very extensive incisions either in the front or back of the leg, would scarcely have rendered accessible. The uncertainty as to which vessel was wounded, rendered such an operation still further inadmissible. Ligature of the femoral artery seemed the only proceeding which gave the chance of the limb being preserved; but the failure of the operation as regards the bleeding, is an excellent illustration of the necessity of adhering to the established rule, unless the peculiar circumstances of the case render it impracticable to do so.

*Secondary Hemorrhage following Amputation of the Leg—Ligature of Anterior Tibial Artery—Reurrence of Secondary Hemorrhage—Ligature of Femoral Artery.*

James Moffat, æt. 8, admitted into the Royal Infirmary September 3, 1851. This boy was sent from some distance in the country, for the purpose of having his foot amputated, on account of disease of the tarsus and ankle-joint. The disease had existed for two years, and had been allowed to advance so far that the entire tarsal bones were destroyed, the probe, introduced through numerous sinuses which existed, passing from one side of the foot and ankle to the other, in various directions. The boy was much emaciated, and presented the scars of strumous abscesses on various parts of his body. It seemed doubtful whether amputation through the malleoli would effect the removal of the entire disease; but it was deemed advisable to perform this operation in the first place, and to remove the limb at a higher point, if the state of the tibia and fibula seemed to render it necessary. Chloroform was administered, and a tourniquet applied above the knee, to prevent the loss of any blood, in the event of the higher operation being found necessary. On disarticulating the foot at the ankle, the carious condition of the bones was found to extend for two or three inches above the malleoli, and amputation was immediately performed about five inches below the knee.

The wound healed rapidly, and the ligatures had all separated ten days after the operation. On the fifteenth day following the amputation, about an hour after taking his breakfast, he was suddenly seized, without any previous indisposition, with a convulsion fit of considerable violence and duration. During the convulsion, he struck his stump violently against the bed, which caused it to bleed, to the extent of about an ounce, from a small part of the wound which remained unhealed on the outer side of the stump. Two days afterwards (September 25th) the hemorrhage recurred, to the extent of four or five ounces, whilst the boy was lying quietly in bed. On examining the stump about an hour afterwards, there was no distension, and there seemed no further disposition to bleeding. The stump was dressed as usual, and a piece of lint, wet with cold water, was applied over the bandage. Directions were given, that if the bleeding recurred, the wound was to be firmly plugged with lint. I was absent from Edinburgh on the following day, and on returning on the 27th, I found that smart arterial hemorrhage had occurred two or three times on the previous day, and had been arrested by the wound being firmly plugged, and by the application

of a bandage. The bandage was tight, and the stump evidently distended beneath the dressings.

The patient was immediately removed to the operating theatre, and, a tourniquet having been applied to the femoral artery, I removed the dressings, and introducing my finger into the opening on the outer side of the stump, broke up the adhesions of the entire wound. On clearing out the clots with a sponge, and slackening the tourniquet, a forcible jet of arterial blood issued from the situation of the anterior tibial artery. The bleeding point was distinctly exposed, but the artery gave way as often as it was seized by the forceps, and it was evidently necessary to place a ligature upon it at a higher point. In order to expose the vessel above the bleeding point, it was found necessary to disarticulate and remove the head of the fibula. This having been done, the artery was brought into view, where it passed through the inter-osseous ligament, and a ligature was placed around it at this point.

Everything progressed favourably for a few days, but the ligature separated so early as the fifth day after its application, and in five days more copious arterial hemorrhage again took place from the stump. A ligature was now applied to the superficial femoral artery, immediately above the crossing of the sartorius muscle. The hemorrhage was at once arrested, and never recurred. The ligature separated from the femoral artery on the 11th day after the operation, and the small wound in the thigh was entirely healed in a day or two afterwards.

The boy made a slow recovery, which was protracted by the formation of a large superficial abscess on the inner side of the knee, and by exfoliation of small portions of the tibia. Under the careful management, however, of a most attentive and diligent pupil, Mr James Loch, the stump is now quite healed, and a small superficial sore only remains on the inner side of the knee. His health is greatly improved, and he is about to return home.

The failure of the practice, which was adopted in the first instance in this case, was attributable, I think, to the cachectic state of the patient's constitution. Secondary hemorrhage occurred on separation of the ligature, which had been applied to the anterior tibial artery, at a short distance (about an inch) from the bleeding point. It was the practice, nevertheless, which I believe ought to be followed, as a general rule, in secondary hemorrhage from a large vessel after amputation. The application of a ligature on a sound part of the vessel half an inch or an inch above the point where the vessel has given way commands the hemorrhage with much greater certainty than the distant ligature, which leaves the collateral branches free to renew the current in the trunk of the vessel, and thus to renew the hemorrhage, which has occurred through the breach in its coats. Various instances have been recorded in which the distant ligature on the main trunk (as the ligature of the subclavian for secondary hemorrhage after amputation at the shoulder-joint) has proved unsuccessful in permanently arresting the hemorrhage from the stump; and these failures have led to the practice, which, though unsuccessfully adopted in the case I have related, is nevertheless that which should, as a general rule, be followed. In the event of its failure, ligature of the main trunk at a higher point may still be resorted to with as good a prospect of success as in the first instance.





# REPORT OF SURGICAL CASES

OCCURRING IN

## HOSPITAL PRACTICE.

BY R. J. MACKENZIE, F.R.C.S.E.,

SURGEON TO THE ROYAL INFIRMARY, EDINBURGH.

### *Cases of Stricture of the Urethra treated by external incision.*

In the number of the "Monthly Journal of Medical Science" for March 1851, I published the details of a case, in which the division of a stricture by external incision had proved fatal from pyaemia.

Having witnessed the success which had followed the operation in numerous cases in Mr Syme's hands, this accident occurring in the first case in which I had followed the practice had no effect in shaking my confidence in the merits of the operation, and I have not hesitated since then to perform it in every case of obstinate stricture which has come under my care, in which the use of the bougie has failed to effect a cure. Although these cases are not numerous, their publication at present may, I think, be of some little use in contributing to increase confidence in the safety of the practice, and in its efficacy as a means of cure. In no case have I met with the slightest difficulty in the performance of the operation, nor anything to occasion a moment's uneasiness as to the result, and I have not performed the operation in any case in which the use of the bougie appeared to me to hold out any prospect of curing the disease.

CASE 1.—"James Ross, æt. 44, a fisherman from Prestonpans, admitted into the hospital, March 17, 1852, with stricture of the urethra of sixteen years' standing, the result of gonorrhœa. He has undergone, at various times, the usual treatment by bougies in the hands of different surgeons; but the stricture yielded on each occasion very slowly. He suffered from rigors and febrile attacks during the treatment, and his symptoms always returned speedily, as soon as the dilatation was discontinued, even although a large-sized instrument had been passed a very short time previously. Latterly, his symptoms have become more aggravated; he can now void his urine only in drops, and with great suffering; and his clothes are constantly wet by the urine, which dribbles away involuntarily. Attempts to pass instruments into the bladder of late have proved ineffectual, and he has come to the hospital willing to submit to anything which may be proposed for his relief."

On introducing a bougie, a stricture was found at the bulb, through which No. 1 was passed, but not without considerable difficulty. The introduction of the instrument was followed some hours afterwards by a severe rigor, and on the following day by retention of the urine. No. 1 catheter was introduced, and retained for some hours in the bladder.

From the history of the case, and from the disturbance which followed the use of the bougie, I determined not to attempt dilatation, but at once to divide the stricture. On the 24th, I made an incision three quarters of an inch in length in the central line of the perineum over the induration at the seat of stricture, and divided the constricted portion of the urethra to about the same extent on a grooved staff of the size of No. 1 bougie. No. 8 catheter was passed into the bladder and retained. The bleeding from the wound in the perineum did not amount to half an ounce. Slight febrile disturbance occurred during the two first days following the operation, but this subsided when the catheter was removed on the 26th. The urine passed in nearly equal quantity through the wound and by the natural channel for about ten days, and afterwards in gradually diminishing quantity through the wound, which was quite closed about three weeks after the operation. April 1st, No. 10 bougie entered the bladder without resistance. Nos. 11 and 12 were afterwards passed occasionally, but there was never any tendency to contraction.

He left the hospital quite well June 12, 1852, the cause of his long residence in the hospital having been an attack of inflammation of the wrist-joint.

June 9th, 1853.—My friend, Mr R. Moir of Musselburgh, writes to me that he has seen Ross within the last few days, and that he remains perfectly well. He passes a full-sized bougie for himself occasionally, but has never the least difficulty in micturition, although he is constantly exposed to cold and wet in his sea fishing.

CASE 2.—John Timmins, æt. 24, a farm-servant, admitted into the hospital, May 12th, 1852. This patient was suffering from gonorrhœa about twelve months ago, when he received an injury of the urethra, while on horseback, by being pitched forward on the pommel of the saddle. A good deal of blood flowed from the urethra after the injury, and he was admitted as a patient of this hospital, where he remained for a short time, till the immediate effects of the accident had passed off. Soon after leaving the hospital, he found that he passed his water in a diminished stream, and the difficulty has gradually increased up to the present time, when he is able to void his urine only in a very small and twisted stream. He does not complain of much pain in micturition, but has very frequent desire to empty the bladder. On passing a bougie, a stricture was found to exist immediately in front of the scrotum, which with difficulty admitted No. 2. An induration existed at the seat of stricture, which felt from the outside in size and density like a swan shot. During the first ten days after his admission into the hospital, Nos. 1 and 2 bougie were passed on three different occasions, but without effecting any improvement. No. 3 could not be passed; he suffered a good deal of pain even when No. 2 entered the stricture.

May 22d.—I divided the stricture in the usual way. The external incision was rather less than half-an-inch in size. A few drops of blood only escaped. No. 8 catheter was introduced into the bladder, and retained for two days. On the 27th, I passed No. 8 bougie, which entered the bladder without the least resistance. After this, Nos. 9 and 10 were passed every second day till June 4th, when he left the hospital, directions being given that he should return occasionally to have an instrument passed.

From the day on which the catheter was withdrawn, he passed his urine in a full stream, not a drop having ever passed through the wound, which was entirely healed eight days after the operation. He returned from time to time for two or three months to have an instrument passed, according to the directions he had received. At first there seemed a little tendency to contraction, but latterly No. 12 passed on each occasion without the least resistance, and he made his water in as good a stream as ever.

This patient returned to report himself well (April 1853) eleven months after the operation. No. 11 bougie passed smoothly into the bladder, although no instrument had been introduced for two or three months previously.

CASE 3.—Gideon Blance, æt. 46, a fisherman from the Shetland Islands, admitted into the hospital, October 6th, 1852, with stricture of the urethra, of twenty years' standing, consequent on gonorrhœa. He had repeatedly suffered during this period from retention of urine, and great difficulty had been experienced occasionally in relieving him by the use of the catheter. Dilatation of the urethra by bougies had alleviated his symptoms, but the improvement had only been temporary; and, from his frequent exposure to cold and wet, his symptoms gradually increased, till latterly he was almost entirely prevented from following his employment, whilst he suffered great misery from pain and difficulty in voiding his urine, and the frequent desire to empty the bladder, which is the usual accompaniment of a narrow stricture. About three months before his admission into the hospital, he had an attack of retention, and the attempt to introduce the catheter through the stricture on this occasion failed. The distended state of the bladder, however, demanded immediate relief, and an entrance was effected by forcing the catheter as nearly in the course of the urethra as could be guessed. The catheter was retained in the bladder for two days, after which he partially regained the power of passing his water. Since this time, however, he has suffered more or less from incontinence of urine and, at the same time, from increased difficulty in making water, which is passed either in drops or in a small spiral stream.

On examining the urethra with the bougie on the day following his admission into the hospital, a stricture was found at the bulb, which tightly embraced a No. 1 bougie; a swelling, of cartilaginous hardness was felt in the perineum at the seat of stricture. Shivering occurred about an hour after the bougie was passed, but was not succeeded by any febrile disturbance. During the next fortnight, Nos. 1, 2, and 3 were successively passed through the stricture, with two or three days' interval on each occasion; but I never succeeded in passing an instrument fairly into the bladder. Mr Syme, who examined the patient on one occasion with me, experienced the same difficulty. The obstacle to its introduction is explained by the history I have already given of the case. For a time considerable improvement took place; but, at the end of three weeks, no further advance had been made than the introduction of No. 3 bougie. More severe rigors now followed the use of instruments; and, instead of any improvement following the use of the bougie, the pain and difficulty in voiding his urine increased, and he was threatened more than once with complete retention. Under the use of the warm bath and opiate enemata, the symptoms of irritation passed off; and, after having omitted the use of instruments for a week, I placed the patient deeply under the influence of chloroform, and passed, with comparative ease, a No. 3 catheter into the bladder, where it was retained for a few hours. Shivering again occurred, followed by slight febrile disturbance, and I determined no longer to delay the division of the stricture by external incision.

November 6th.—Chloroform having been administered, and a grooved staff, of the size of No. 3 bougie passed into the bladder, the stricture was divided in the usual way, the extent to which the urethra was divided, and the extent of the external incision, being each rather less than an inch. The texture composing the stricture was very dense, and cut like cartilage. No. 3 catheter was introduced into the bladder, and secured in the usual way. Not so much as an ounce of blood was lost in the operation. A little oozing of blood occurred two hours afterwards, but ceased immediately on the application of a cold sponge.

No constitutional disturbance followed the operation; he slept well, and suffered not the slightest uneasiness. The catheter was removed on the third day, after which the urine passed partly through the wound, but in gradually increasing proportion by the natural channel. On the tenth day following the operation, the wound was entirely healed, no water having passed through it for two or three days previously.

On November 14th, No. 3 bougie was passed without resistance into the



bladder. On the 16th, No. 10; 18th, No. 11; on the 20th, No. 12 entered as readily as if no stricture had ever existed. He returned home on the 26th, entirely free from his former symptoms, and able to pass his urine in a full stream, and without difficulty.

My friend, Dr Cowie of Lerwick, writes to me (June 1853) that since Blance has returned home he has continued quite well. A full-sized bougie has been passed two or three times, according to my request. "He feels as well as when he returned home, and passes his urine in a full stream."

CASE 4.—"William Taylor, æt. 52, admitted into the hospital, January 15, 1853, having suffered from stricture of the urethra for the last twenty years. He has repeatedly been under the treatment of various surgeons, but no larger instrument than the smallest sized bougie has ever been passed into the bladder. About four years ago, he suffered from retention of urine, when all attempts to pass even the smallest catheter failed, and the operation for stricture with retention was performed (incision of the urethra on the point of a catheter). Since that time the greater part of the urine has passed through various fistulous openings in the perineum, around which there is now great swelling and induration, extending from the scrotum nearly to the anus. On examining the urethra, two strictures were found to exist, one about two inches from the orifice of the urethra, the other at the bulb." After one or two unsuccessful attempts, I succeeded in passing No. 1 bougie into the bladder, where the instrument came in contact with a stone. The introduction of the bougie was followed by shivering and a smart febrile attack, which lasted for three days. On the 26th I again introduced No. 1, which was followed by the same constitutional disturbance.

As no improvement followed the use of the bougie, but, on the contrary, the pain and difficulty of micturition and the frequent desire to empty the bladder had rather increased, I determined, before attempting to treat the stricture, to remove the stone, the presence of which in the bladder would have effectually resisted any progress in the dilatation of the urethra.

On the 2d of February I performed the operation of lithotomy on a staff of the size of No. 2 bougie. The stone, which was of considerable size, crumbled to pieces under the first grasp of the forceps, and was removed in numerous fragments. The bladder was washed out and the operation concluded without a lengthened search for any small portions of stone, which might have escaped detection, a proceeding which might have been productive of mischievous consequences, and which was rendered unnecessary by the small size of the fragments into which the stone had crumbled. Two or three of these fragments passed through the wound a few days after the operation. The patient made a speedy recovery.

About a fortnight after the operation I passed No. 1 bougie and found that it was tightly grasped by the strictures. No shivering, however, followed the use of the bougie, and, by February 25th, so readily had both strictures yielded, that No. 7 passed easily into the bladder. The urine began to flow in diminished quantity through the fistulous openings in the perineum, and I expected before long to have dilated the urethra to its normal size, when, without any assignable cause, the anterior stricture again became so contracted that I could pass nothing larger than a small probe through it. He suffered considerable pain on any attempt being made to pass a larger instrument, his former pain and difficulty of micturition returned, and the urine became loaded with mucus. The use of the bougie was abandoned for a short time till the irritation of the bladder had subsided; but the stricture still proved quite unyielding. The bladder again becoming irritable, and his health beginning to suffer, he left the hospital and went to the country for a short time, but returned, March 21st, in better health, but his urinary symptoms continuing, and the stricture so tight that it admitted only a small probe. The urine passed almost entirely through



the fistulous openings in the perineum, a few drops still passing through the lithotomy wound.

On the 2d of April, I divided the anterior stricture on a very small grooved director (the incision of the urethra being about half-an-inch in length), and passed No. 10 bougie without difficulty into the bladder. No catheter was introduced. From this time he voided his urine in a good stream, and without any pain or difficulty. The wound was healed in the course of a few days, not a drop of urine having passed through it after the operation. Five days after the division of the stricture, I passed No. 9, and subsequently Nos. 10 and 11 bougie into the bladder. His health improved rapidly, and he left the hospital on the 22d, having been previously instructed to pass a bougie for himself, and with directions to introduce it occasionally. At the time of his dismissal he was perfectly well, the urine quite healthy, and voided in a full stream, but a considerable quantity passing through the old fistulous passages, which were still surrounded by considerable induration and swelling. Rather than lay open these fistulous tracks, I recommended him to continue the occasional use of the bougie, in the hope that they would gradually close, now that the urethra was restored to its normal capacity.

I saw this patient in the country a month after his dismissal from the hospital, and passed No. 11 into the bladder. There was no tendency to return of the stricture. He expressed himself as very grateful for the relief he had obtained, and said that he enjoyed a degree of health and comfort, to which he had been a stranger for many years. Some urine, however, still continued to flow through the fistulous openings, which will probably require to be laid open to complete his cure.

CASE 5.—John Handyside, æt. 27, a baker, admitted into the hospital, April 7, 1853, with chronic enlargement of the testis, and stricture of the urethra of above a year's standing, the result of gonorrhœa. He has been under treatment by bougies, as an out-patient, for the last two months; but no advance has been made beyond the introduction of No. 5 bougie. The stricture is situated at about three inches from the orifice, where a very dense induration is to be felt extending along the urethra for nearly an inch. No improvement in his symptoms has followed the use of bougies, and he has the same difficulty in micturition, and as much pain when an instrument is passed, as when the treatment was commenced.

On the day following his admission, I divided the stricture by external incision, and introduced a No. 8 catheter into the bladder. The catheter was withdrawn at the usual time; but on introducing a bougie of the same size, a few days afterwards, I found an obstruction still existed, and some induration remained at the posterior part of the wound; the stricture had not been sufficiently freely divided (a mistake, which, however simple the operation appears, requires some care to avoid). I accordingly made a second incision, and divided the whole of the dense tissue which composed the stricture, after which a No. 12 catheter was passed into the bladder and retained for twelve hours. A little urine passed through the wound for a few days after the operation, but this ceased after the passage of a full-sized bougie. He remained in the hospital till May 24th, No. 13 bougie having been introduced every second day. A little tendency to contraction appeared to remain, and he was instructed to pass occasionally a bougie of the size of No. 12, for some time. He returned to the hospital a short time afterwards to report himself well. There seemed to be a little tendency to contraction, and he continued the daily use of the bougie.

CASE 6.—"John M'George, æt. 33, a sailor, admitted into the hospital, April 23d, 1853, with stricture of the urethra, the symptoms of which have existed for many years, but have not given rise to much distress till within the last eighteen months. For the last month he has suffered from nearly complete

retention, the bladder being distended, and the urine being voided, after prolonged efforts, only in drops, and with great pain. He suffers at the same time from incontinence, his clothes being constantly wet with urine. Attempts have been made by different surgeons to pass small catheters, but without success." On introducing the smallest sized bougie, a stricture was found at the bulb, through which the instrument could not be passed. An induration of considerable extent could be felt in the perineum at the seat of stricture. After two or three ineffectual attempts to introduce an instrument, I succeeded on the 27th in passing No. 1 catheter into the bladder, where it was retained for some hours. On the 30th, No. 2 was introduced, and on May 2d No. 3. After this I could not succeed in passing a larger instrument than No. 2, whilst his symptoms continued as urgent as on admission.

May 11th.—I divided the stricture on a grooved staff in the usual way. The only unusual occurrence in the operation was bleeding, which took place to the extent of about three ounces during the operation. A No. 12 flexible catheter was passed into the bladder, and secured in the usual way. On the patient being removed to bed, the bleeding continued in spite of the application of cold; and a plug of lint was introduced into the wound, which at once arrested the hemorrhage. The lint was removed on the following day, and the catheter was withdrawn on the 13th.

No disturbance, local or constitutional, followed the operation; the greater part of the urine passed through the wound for the first few days, and afterwards in gradually increasing proportion by the natural channel. On the 18th, No. 11 bougie was found to pass smoothly into the bladder. After that No. 12, and subsequently Nos. 13 and 14, were passed every second or third day.

At present (June 10th) the wound is all but healed, but a few drops of urine still occasionally pass through it. He is perfectly well, and voids his urine in a full stream without any uneasiness. No resistance is encountered in passing No. 14 into the bladder.

CASE 7.—Peter Lamb, æt. 35, a labourer, admitted into the hospital, November 29th, 1852, with phymosis and stricture of the orifice of the urethra, of five years' standing, the result of gonorrhœa.

This patient laboured under the usual symptoms of irritable bladder, and could void his urine only in drops, and with great suffering. December 1st.—Circumcision was performed, and the orifice of the urethra was found so contracted that a small probe only could be made to enter it. A few days afterwards, a grooved director was introduced, and the urethra was incised, so as to allow of the passage of a full-sized bougie. The patient remained in the hospital for a month, during which time No. 16 bougie was daily introduced. On his dismissal from the hospital he was provided with a short piece of metal of the same calibre, which he was directed to pass occasionally through the orifice for some time. The wound was quite healed; he passed his urine in a full stream, and was entirely free from his former urinary symptoms. The tendency to contraction was easily counteracted by the use of the bougie.

These are the only cases of stricture in which I have found it necessary to depart from the usual treatment by bougies. Sufficient time has not elapsed to prove the permanency of the cures; but they are amply corroborative of Mr Syme's experience of the operation being an immediate and effectual means of relief from the distressing symptoms, which attend a narrow and unyielding stricture of the urethra. It was said at a late meeting of the Medical and Chirurgical Society of London, that the danger of Mr Syme's operation was equal to that of lithotomy. Even were it so, I cannot see that this would prove any valid objection to the operation. No one thinks of abandoning the operation for stone because one patient dies of every six or seven operated on, and yet the symptoms produced by an unyielding stricture of old standing are quite as distressing, and as certainly followed by fatal consequences, as those produced by the presence of a stone in the bladder. But the facts are very differ-

ent; for of all the cases in which the operation has been performed in Edinburgh by Mr Syme and others (nearly a hundred in number), my own case, already referred to, is the only one, as far as I can learn, in which a fatal result has followed the operation.

I have not met with any difficulty in the performance of the operation, nor can I see any likelihood of difficulty arising when the grooved staff has been properly introduced, if the stricture is fairly divided on the groove. Some embarrassment might occur if the staff were withdrawn without the stricture having been sufficiently divided; and difficulty might arise in introducing the catheter, from its point becoming engaged in a false passage if such existed in the neighbourhood of the stricture. To avoid these accidents, I have had a very simple contrivance made at the suggestion of my friend, Mr Walton of St Mary's Hospital, London, which would effectually meet the difficulty. The handle of the grooved staff screws off, and is replaced by what Mr T. Wakley calls a "conducting rod," and upon this a flexible catheter is passed over the staff along the urethra. If the stricture is still imperfectly divided, the passage of the instrument will be obstructed, when the knife may be again used, the staff not having been removed. The stricture being thoroughly divided, the catheter conducted by the staff passes easily on to the bladder. I have not used this instrument in performing the operation, having always satisfied myself that the stricture was quite divided by passing a director through the wound, and pushing it both backwards and forwards along the groove before withdrawing the staff. I should employ it, however, in any case in which, from the existence of a false passage, I anticipated any difficulty in introducing the catheter after the staff had been withdrawn.

Except in Case 6, I have always employed the silver catheter as recommended by Mr Syme. It appears to me immaterial which is used, but I think the patient has less constraint in changing his posture with the flexible than the metallic instrument; the former, perhaps, is more liable to be displaced, but a little care on the part of the patient will prevent this.

I have not met with hemorrhage except in one case (No. 6). I was as careful on this occasion as usual to cut directly in the mesial line, but the patient was one whom it was very difficult to bring fully under the influence of chloroform, and he struggled violently during the operation, and it is possible the knife may have diverged slightly from the central line, although I am not aware that it did so. In this case a compress of lint at once arrested the bleeding.

Mr Syme believes that, if the incision is made directly in the mesial line, the danger of hemorrhage is imaginary, and his experience has pretty well proved it to be so. Even in the event, however, of bleeding, the application of a compress is all that would be requisite, and this, if necessary, might be secured in its place by temporarily closing the lips of the wound by one or two sutures, a silver catheter having of course been previously introduced and retained in the bladder.





# LIGATURE OF THE SUBCLAVIAN ARTERY,

IN A CASE OF HEMORRHAGE FROM THE AXILLARY ARTERY.

BY  
R. J. MACKENZIE, F.R.C.S.E.

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THE following case appears to me worthy of being placed on record, not from the fact of its being one of simple deligation of one of the larger arteries having been followed by a favourable result, but from the interest which attaches itself to it, as an injury of an unusual nature: and, more especially, I think it may prove of interest, from the fact, that a very small number of cases (amounting only to six or seven) have been recorded, in which a ligature has been placed on the subclavian artery for the purpose of arresting hemorrhage from a direct wound of the axillary artery, and as I believe that the practice to be pursued in similar circumstances would still be a matter of considerable doubt in the minds of most surgeons.

John Forrester, a married man, of thirty-five years of age, a warehouse clerk, of temperate habits.

On the 5th of November 1845, this man, on returning in the evening from his employment, found his children amusing themselves with a red-hot poker, which they had put into the fire, from which it had just been removed as he entered the room. He immediately snatched the poker with his left hand from the boy who held it, and, in making after the young delinquent to chastise him for his misdemeanour, he stumbled and fell forwards. In trying to save himself from the fall, he stretched out his left hand, which bringing

the butt end of the poker to the angle of the room, where the wainscot and floor met, he fell with his whole weight on the red-hot point, which entered the right axilla, immediately behind the tendon of the great pectoral muscle.

The poker was instantly withdrawn from the deep and scorched wound, from which a few drops of blood escaped. The pain was described as extreme for about five or ten minutes, when he was greatly relieved by the application of a bread and water poultice. Great redness of the surrounding integuments supervened, with a considerable degree of fever, which confined him to bed.

The application of poultices was continued till November 13th (eight days after the occurrence of the accident).

On the forenoon of that day, a large eschar was separated, and, on its coming away, a sudden and copious gush of blood took place from the axilla, which was partially arrested by stuffing the wound with rags, till a surgeon in the neighbourhood arrived, who applied a compress of lint, soaked in an astringent solution. As the hemorrhage, however, was not altogether arrested, further assistance was sent for from the New Town Dispensary, and Dr William Robertson soon afterwards saw the patient. The lint was then removed, and the bleeding effectually kept in control by the careful application of a compress and bandage. It was difficult to estimate the quantity of blood which had been lost, but it had probably not exceeded twenty ounces.

On the evening of the same day, as he complained greatly of the pain caused by the compress in the wound, it was removed, and, there being then no return of the bleeding, and the whole surface of the cavity having a sloughing appearance, water-dressing with oiled silk was applied. A considerable degree of fever existed, for which an antimonial solution with sulphate of magnesia was ordered.

At Dr Robertson's request, I visited the patient the following day, when I found him free from fever, and suffering little pain. The surface of the wound, which was situated in the axilla, immediately to the inner side of the biceps, and behind the tendon of the great pectoral muscle, was about two inches in length and an inch in breadth, was covered with a grey slough, and secreting a thin watery discharge. The skin in its neighbourhood was of a dark red colour, and there was considerable hardness and infiltration around the shoulder and upper half of the arm.

As the impropriety of making any further examination of the wound was evident, I re-applied the water-dressing, and explained to Forrester's wife, that, should the bleeding return, it was to be repressed by removing the dressing, and firmly pressing her finger to the bottom of the wound. I likewise pointed out the spot where the subclavian artery might be compressed in the neck.

At seven o'clock the following morning (Nov. 15), I was sent for on account of a return of the hemorrhage, which had occurred in a

full stream on his turning himself in bed. On entering the room, I found him lying in bed in a large pool of blood, his wife on her knees over him, applying most effectual pressure on the subclavian artery over the clavicle, by which means she had succeeded in having the bleeding entirely under her control. The moment the pressure was relaxed, a profuse flow of arterial blood took place, which I checked by the application of a firm graduated compress in the wound, supported by a bandage applied from the fingers to the shoulder. The quantity of blood lost appeared to be from twenty-five to thirty ounces.

On the following day (16th) there was no return of the bleeding, but he complained severely of pain in the wound, and in the whole ulnar side of the arm. He was feverish, but had slept for several hours during the night.

On visiting him the following afternoon (17th), I found the bandages again saturated with blood, and he complained of increased pain and tightness in the neighbourhood of the wound, with a feeling of cold and numbness in the hand and forearm. I removed the dressings, and the instant I took the compress out of the axilla, a copious gush of arterial blood took place, which was immediately arrested by a fresh compress, secured as before. No bleeding took place that evening, but on the following forenoon (18th), the dressings were again becoming gradually more stained with blood.

Having previously narrated the details of the case to Mr Syme, and having had the benefit of his advice as to the measures which I had already pursued, I now obtained his opinion as to the proper course to be adopted, as it was evident that compression could not be much longer continued without great risk to the patient.

It was thought, that if, on careful examination of the wound, the bleeding point could be discovered to be not far distant from the external orifice, the opening should be freely dilated, and the vessel, if possible, be tied at a sound point above and below the opening. In the event of this being found impracticable, one of two courses remained to be pursued—the application of a ligature to the subclavian artery, or amputation at the shoulder joint. The performance of the latter operation was certainly that attended with the greatest chance of success, and with least danger to the patient. The vessel would probably have been divided, in the incisions, above the injured point; and the patient was in a state by no means unfavourable for the performance of such an operation. Again, the free anastomosis, existing between the branches of the axillary and subclavian arteries, rendered the propriety of trusting to ligature of the latter vessel, as a means of arresting the hemorrhage, very questionable. As the patient, however, from his employment, depended for the means of subsistence on the use of his right arm, Mr Syme was of opinion with myself, that the ligature of the subclavian should be first adopted, when, in the event of a recurrence of the hemorrhage, am-

putation might be performed as a last resource, with as much safety as before the application of the ligature.

Shortly afterwards, I visited the patient with Dr Duncan, when we proceeded to examine the wound, with the view of ascertaining the state of the parts in the axilla. On removing the compress, no blood flowed from the wound, the edges and surface of which were sloughing, and the dressings were saturated with a thin and fetid discharge. On introducing the finger into the opening, it was found to pass upwards and inwards into the axilla, to the depth of about three inches, and at the bottom of the wound the axillary artery and surrounding nerves were found lying bare, the vessel being exposed to the extent of about half an inch. The parts in the neighbourhood were much infiltrated with blood, and the shoulder and upper part of the arm were considerably swollen and ecchymosed.

The depth of the wound and infiltrated state of the tissues rendering any operation here (at any time perplexing) now one of extreme difficulty; and, moreover, the chance of our being able to reach the vessel at a sound point being very small, the idea of resorting to this proceeding was at once abandoned, and Dr Duncan readily concurred in the proposal to place a ligature on the subclavian artery above the clavicle.

As the room where the patient resided was small, ill-ventilated, and badly lighted, it was thought advisable to remove him, previously to the operation, to a comfortable lodging in my own vicinity, which was accordingly done on the same afternoon. Previous to his removal, however, the compress was replaced in the axilla, and the limb supported by a bandage carefully applied from the fingers to the shoulder.

When I visited him the following morning, he was pale and exhausted, restless, and anxious that something should be done for his relief. He complained of the tightness of the bandages, which had again become saturated with blood during the night. He willingly assented to my proposal of tying the vessel, and expressed himself as anxious for the performance of the operation as soon as possible.

The operation was performed at 10 o'clock A.M. (Nov. 19th), in the presence of Dr Davidson, Dr Duncan, Dr William Robertson, Dr Graham Weir, Dr H. Douglas, and Mr Howden, to whom I was much indebted for their kind and able assistance.

The integuments being drawn down by the hand of an assistant, an incision was made over the clavicle, the skin divided, extending from over the outer border of the clavicular portion of the sternomastoid for about three and a half inches outwards, parallel with the clavicle, and about half an inch above that bone. A few fibres of the platysma-myoides were divided, and the external jugular vein, which lay in the outer third of the wound, was slightly separated by the knife from its cellular connections, and held by a copper spatula to the outer side of the incision. The rest of the platysma engaged



in the wound, and a few fibres of the clavicular portion of the sternomastoid, were next divided. After a little dissection, and the opening of the deep cervical fascia, the lower border of the posterior belly of the omo-hyoid was brought into view, below which a mass of adipose tissue protruded; this, being rather in the way of the knife in clearing the deeper parts, was dissected out and removed, when a branch of the brachial plexus was seen running across the bottom of the wound. On now introducing the finger, the insertion of the scalenus anticus into the tubercle of the ribs was easily recognised, and the artery was felt pulsating to its outer side. A blunt hook being now introduced at the inner part of the wound, and the parts slightly retracted towards the sternum, a very slight dissection exposed the coat of the artery. This was laid bare to the extent of about a sixth of an inch, and a common aneurism needle easily passed around it from within outwards. The ligature was then tightened, and tied with a double knot. The edges of the wound were brought together by three points of suture; and a piece of lint, moistened in cold water, applied. One small vessel was divided at the first incision, which was twisted. The patient bore the operation remarkably well, and showed his want of consciousness of the tightening of the ligature, by inquiring, after the knot was secured, if "the tying of the thread would give him much pain."

An opiate, consisting of a drachm of solution of muriate of morphia, was given. Some oozing of blood took place about two hours after the operation, by which slight tension of the sides of the wound was produced. Had the stitches been then divided, and the coagula removed, the wound might have been left in a more favourable state for union; but as the patient, though willing to submit to anything which might be thought proper, was rather alarmed at any further interference, I thought it better to be satisfied with the continuance of the cold applications.

At 8 P.M., he felt quite comfortable, and had slept for three hours in the afternoon. Pulse 80; skin cool. He complained a little of heat in the arm and hand of the side on which the vessel had been tied, and the temperature of the surface of these parts was higher than the rest of the skin. The bandages, which were saturated with blood, had become dry and hard, the oozing from the axilla having evidently ceased. The compress was left *in situ*, but the bandages retaining it were cut, so as to remove as far as possible all pressure from the axilla. There was faint pulsation perceptible in the brachial and radial arteries. The opiate, as above, was repeated at 11 o'clock P.M.

20th.—Slept nearly all night, and expresses himself as being free from pain and much better. Pulse 72; tongue clean and moist. The bandage was taken off from the arm and hand, and the compress gently removed from the wound in the axilla. The surface of the arm felt hot and dry, and on raising himself to sit up in bed the

limb assumed a livid colour from venous congestion. On laying him down, however, and slightly raising the arm, the limb very soon assumed its natural colour and appearance. The edges of the axillary wound were covered by pale granulations, but the deeper part of the cavity seemed to have an unhealthy or sloughing surface. The discharge was copious and healthy. A small quantity of dry charpie was laid in the wound. Water-dressing, with oiled silk, was applied to the wound over the clavicle, which looked well. The same dressings were repeated in the evening.

21st.—Passed a restless night, but slept for two hours towards morning, and in the forenoon he appeared very well. Pulse 76; tongue clean and moist; skin cool; suppuration commencing in the wound over the clavicle. One of the stitches was removed, and a bread-and-water poultice applied. The arm and hand are of natural temperature and colour. The wound in the axilla, as deep as can be seen, is covered by pale granulations. Discharge healthy and diminished in quantity. The cavity was gently cleansed by means of a syringe and warm water, and charpie applied as before. Bowels freely acted on to-day by medicine.

23d.—Was rather feverish yesterday, with heat of skin and dry tongue. Both wounds, however, progressed favourably. He was ordered an antimonial solution, with sulphate of magnesia. To-day he feels much better, having slept for several hours during last night. Pulse 72; tongue clean and moist. There is a considerable degree of hardness, with slight redness around the wound over the clavicle, and strong pulsation is felt over the inner side of the incision. The remaining stitches were removed, and bread-and-water poultices continued. The wound in the axilla is now covered with healthy granulations, from which there is a copious discharge of healthy pus.

25th.—Going on well in all respects. Pulse 72; tongue clean and moist; bowels opened twice yesterday by medicine; sleeps tolerably well at night. A considerable quantity of coagulated blood has been discharged from the wound over the clavicle, the surface of which is now granulating and contracting, being dressed with a sulphate of zinc lotion. Axillary wound contracting, the discharge being considerably diminished. He complains of a prickling pain in the wrist and fingers, which is relieved when the discharge has free vent from the axilla. The pulsation of the radial artery is now very distinct.

29th.—A sinus was to-day discovered running from the wound in the axilla behind the humerus, which, when the patient lay on his back, allowed the matter to collect behind the posterior border of the deltoid muscle. A counter-opening was made at this point to give free issue to the matter. The discharge from the axilla has continued to be copious, but the surface of the wound is contracting, and is covered by healthy granulations. The wound over the

clavicle is entirely cicatrised, except at the small opening where the ligature hangs out, from which point there is a slight healthy discharge.

December 7th.—The discharge from the counter-opening, which was at first pretty copious, gradually diminished, and in three or four days ceased, when the small wound closed. Since then the discharge from the axilla has been greatly reduced, and the wound in that part is now merely a superficial granulating surface, of the size of a shilling. Although the patient has a blanched appearance from loss of blood, his health has been very slightly impaired, and he now feels strong, and submits unwillingly to the necessary restrictions of diet. His only complaint is of a distressing prickling pain in the little finger, and the ulnar side of the ring-finger and hand. This he suffers from generally when he awakens from sleep, or after lying for a long time in one position, speedy relief being obtained by a change of posture, and slight muscular exertion of the hand and arm.

8th.—This evening (twentieth day from the operation) the ligature was found lying loose in the wound, and was removed.

22d.—The day after the separation of the ligature the wound over the clavicle was found to be entirely healed. The axillary wound contracted rapidly, and has now been for some days firmly cicatrised. The patient has nearly quite regained his former robust health, and has resumed his occupation, being now enabled to write as well as before the occurrence of the accident. He still occasionally complains of slight prickling pain in the ulnar side of the wrist and hand; but this, he says, is gradually diminishing, and is already very trifling. Pulsation is entirely absent in the brachial, radial, and ulnar arteries; nor can the existence of the inosculating arteries be perceived by the finger on careful examination of the limb.

In considering the facts of this case, it is evident that the untoward symptoms which were to be apprehended after the application of the ligature, were gangrene of the limb, or a renewal of the bleeding from the wounded vessel, under either of which circumstances amputation must have been performed. The swollen and infiltrated state of the arm, with the feeling of cold and numbness of the hand, were conditions by no means promising for the vitality of a limb, in which the supply of blood was to be cut off from its main arterial trunk. The pressure of the compress upon the vessels and nerves of the axilla could not, I believe, have been much longer continued without producing mortification of the limb; and the possibility of diminishing with safety, or altogether removing, this pressure after the application of the ligature, appeared to me to render the risk of gangrene much smaller by removing this obstruction to the venous circulation of the limb. The diminution of the swelling, which rapidly followed the cutting of the bandages and removal of the compress, showed this to be the case.



A return of the hemorrhage from the axilla was certainly the danger to be most apprehended, and was, perhaps, the only real cause of anxiety for the issue of the case. The free anastomosis existing between the branches of the axillary and subclavian arteries is sufficient, in general, to admit of a return of pulsation in aneurismal tumours in this situation, at a shorter or longer period after ligature of the subclavian artery. Had the re-establishment of the circulation in the present case proved sufficient to renew the hemorrhage, amputation must have been immediately performed, as further pressure in the axilla would then have been inadmissible.

The destruction of the coats of the vessel, however, I believe to have been of very limited extent, as rapidly fatal and much more copious hemorrhage than appears to have taken place in the present instance, often occurs from a very trifling lesion of the arterial coats.

The surface of the wound, after the separation of the eschar, was healthy, and, as far as could be seen at the time of the operation, showed no further disposition to unhealthy action than was probably induced by the pressure of the compress.

These circumstances led me to believe that the shrinking of the artery after the application of the ligature, and the contraction of the wound, which would probably take place after the removal of the compress, would prove sufficient to close the opening in the vessel before the collateral circulation was established.

Had the opening in the vessel, on the contrary, been of larger size, and produced by unhealthy or phagedenic ulceration, the prognosis must undoubtedly have been much less favourable than under the conditions above-mentioned.

The risk of secondary hemorrhage at the separation of the ligature was comparatively small, seeing that the artery at the point where the ligature was applied was sound, and all suspicions of that chronic disease of the arterial system, which is such a frequent cause of dread in similar operations for aneurism, were here absent.



# CASE OF ANEURISM

OF THE

## UPPER PART OF THE AXILLARY ARTERY,

ATTENDED BY CERTAIN PECULIARITIES,

AND

UNSUCCESSFULLY TREATED BY LIGATURE OF THE SUBCLAVIAN ARTERY.

BY

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THE form of aneurism, of which I believe the following case to be an example, is that first specially described by Mr Liston in a paper read before the Royal Medical and Chirurgical Society of London in 1842.

The case which drew Mr Liston's attention to the subject of the occasional communication of arteries with the cysts of abscesses, must be in the recollection of many. It was that of a boy, who suffered from strumous abscess beneath the angle of the jaw, and where a communication existed between the cyst of the abscess and the carotid artery at its bifurcation, the coats of that vessel having apparently formed part of the walls of the abscess, and having given way at one point by ulceration, so as to give rise to the formation of a false aneurism.

The nature of the case being misunderstood, an opening was made, from which a profuse flow of arterial blood took place. The wound was immediately closed, and a ligature was placed low on the carotid artery on the following day. The case terminated fatally from secondary hemorrhage; and, on dissection, it was found that a direct communication existed between the canal of the artery and the cavity of the abscess. The opening of communication was situated on the posterior aspect of the vessel, and exactly at the bifurcation of the common carotid trunk. It was "about three lines wide, and two and a half lines long." Its edges

“well-defined and slightly everted.” “The external coat of the artery was distinctly traced, and afterwards dissected from the middle coat quite up to the margin of the opening, where it terminated abruptly, not being reflected on to the inner surface of the tumour.”

The full details of the above case were read by Mr Liston to the Medical and Chirurgical Society of London; and a careful perusal of these details, as subsequently published by Mr Liston, can scarcely leave any doubt in the mind of the reader, that the view of the case taken by Mr Liston was correct,—viz., that the aneurism was of secondary formation,—that the disease originated in abscess,—that, the trunk of the carotid forming part of the walls of that abscess, the arterial coats gave way by ulceration at a certain point, by which the cyst, hitherto that of an abscess, was converted into that of a spurious aneurism.

Such a variety of aneurism, however, was scarcely known; sufficient attention certainly had not been directed to it. Doubts were accordingly entertained by many as to the true nature of the case, and Mr Liston's valuable paper was refused a place in the transactions of the Society. It was, however, immediately published by the author, with an appendix, in which, along with the cases contained in the original paper, eight instances of somewhat analogous cases are collected. Of these eight cases, however, *two* only can be said to be precisely similar to that of Mr Liston. In case 8, from the work of M. Robert, of Paris, the coats of the aorta close to the origin of the innominate artery had given way by ulceration, and the blood issued from the perforation into the unopened cavity of an abscess. In case 9, by Mr Quain, of University College, London, the coats of the radial artery had been disorganised in the extension of a phlegmonous abscess. The aneurismal nature of the swelling was detected, and amputation was performed. On laying open the swelling, the destruction of the coats of the vessel was found to be so extensive, that the artery was entirely divided. The evidence as to the origin and nature of the aneurism in this case seems to be quite conclusive, and would be sufficient, in absence of other proof, to establish the fact, that the coats of an artery may, like other tissues, give way by ulceration in the extension of a yet unopened abscess.

The other six cases mentioned in the paper, I have said, are somewhat analogous to that related by Mr Liston. In none of them, however, is it distinctly proved that the ulceration of the coats of the artery preceded the opening of the abscess, whilst in some it is evident that the giving way of the artery occurred during the ulceration or sloughing of the tissues, which followed the exposure of the cavity. In one of these cases, quoted by Mr Liston, I placed a ligature on the superficial femoral artery, on account of hemorrhage from the popliteal.<sup>1</sup> In this case, which had been in the hos-

<sup>1</sup> See Mr Liston's Pamphlet.

pital under Mr Syme's care, an abscess had been opened in the popliteal space; and on introducing the finger into the opening, the artery was felt distinctly beating on the finger placed between the vessels and the bone. Unhealthy ulceration of the parts ensued, on account of which the patient was removed from the hospital, and three weeks intervened between the opening of the abscess and the occurrence of the hemorrhage.

The occurrence of hemorrhage from a large arterial trunk, which has become involved in the open ulceration or sloughing of surrounding tissues, is not very rare. A good many cases are recorded, where the same event has occurred at a shorter or longer interval after the opening of an abscess, which has not appeared to have been followed by well-marked ulceration of the tissues. But the opening of an artery into the cavity of an unopened abscess, so as to give rise to the formation of a false aneurism, appears either to be a lesion of very unusual occurrence, or one which, if less rare, has been too much overlooked by surgical writers. The three cases recorded by M. Robert, by Mr Liston, and by Mr Quain, are all which I have been able to find in which these precise conditions existed. A case, however, is related by Dr Edward Dewes, physician to the Coventry and Warwickshire Hospital,<sup>1</sup> which appears to be of a similar character. The case is published as one "of false diffused aneurism of the abdominal aorta, caused by caries of the vertebræ." The existence of an abscess in this case is not mentioned; but I presume, from the nature of the disease, and from the fact of several pieces of exfoliated bone being found lying loose among the coagula, that suppuration must have preceded the opening of the artery. The precise cause of the breach in the arterial coats, however, is not quite clear. A case is mentioned by Mr Miller,<sup>2</sup> (which is cited as "especially conclusive" on this point) "in which the aorta, where in contact with an unopened abscess, was found ulceratively eroded *from without*, the inner coat alone remaining, attenuated, yet entire."

Whilst, however, the cases which I have quoted seem to prove the occasional formation of this variety of aneurism, the possibility of its occurrence does not appear to be generally admitted as a pathological fact. The subject is not mentioned in most of the later works on systematic surgery; the fact of the occasional communication of the canal of an arterial trunk with the cyst of an abscess is indeed not admitted by some of the highest surgical authorities of the present day. This, I think, is probably to be explained by two circumstances:—1st, The rare occurrence of this form of aneurism; and, 2d, The difficulty of proving the order in which the pathological changes in the cyst and in the coats of the artery have occurred; the difficulty, in other words, of proving that the cyst was not originally that of an ordinary aneurism, in

<sup>1</sup> London Journal of Medicine, January 1852, p. 35.

<sup>2</sup> Principles of Surgery, p. 212, foot note.

which suppuration has subsequently occurred ; and this difficulty may have given rise in similar cases to the true nature of the aneurism being overlooked.

It is well known that the coats of an artery resist, longer than most other tissues, the morbid action by which surrounding textures are destroyed. In spreading ulcerations, however, the arteries frequently become involved in the morbid action, and their perforation gives rise to hemorrhage ; and although they undoubtedly resist for long the ulceration of the tissues, by which an abscess extends its limits ; yet there is no reason to believe that they may not at length suffer from the destructive action to which the surrounding tissues have more readily yielded. On this subject Bécclard says :—" The external coat of the arteries long resists the morbid changes which are taking place around it. It is to be seen remaining entire in the midst of affections of long standing. \* \* \* Occasionally, however, it terminates by participating in the disease of the neighbouring tissues." <sup>1</sup>

The veins appear to participate in the ulceration of surrounding tissues more readily than the arteries ; and various cases are recorded, where the venous coats have given way in the midst of an opened or of an unopened abscess, by which what may be termed a *venous aneurism* has been formed,—a lesion quite analogous to the form of arterial aneurism under consideration. Instances of this occurrence in the jugular veins, in cases of abscesses of the neck following scarlatina, have been frequently recorded. <sup>2</sup>

In the history of the following case, which has been lately under my care, and in the pathological appearances of the parts as seen on dissection, *conclusive evidence*, I think, is wanting to prove that the aneurism was of the variety described by Mr Liston. Although, however, as must frequently happen in similar cases, absolute proof of the nature of the tumour is wanting, the history of the origin and progress of the disease, the changes which the tumour underwent after deligation of the artery, taken along with the appearances found on dissection, are such as to leave no doubt in my own mind that the aneurism was one of secondary formation, and produced by ulceration of the coats of an artery, which formed part of the walls of an abscess.

Absolute proof of this view of the case being wanting, an attentive consideration of the details of the case is required before arriving at any conclusion on the point.

On the 16th of November last, I was requested by a friend to visit a young man, who had applied to him, on the previous day,

<sup>1</sup> Bécclard—Addit. à l'Anat. Gen. de Bichat.

<sup>2</sup> London and Edinburgh Medical Journal, March 1843. p. 177. *Ibid.* p. 386. *Ibid.*, July 1844, p. 632. A case by Dr A. M. Adams, of Glasgow, in which it is doubtful whether the vessel implicated was an artery or a vein.—*Ibid.*, April 1845 p. 265.



for advice, on account of a pulsating swelling, presenting the usual symptoms of aneurism, situated beneath the right clavicle.

On visiting the patient, I examined the tumour with care, and found that it presented all the usual signs of aneurism. Mr Syme visited him with me on the same day, and had no difficulty in arriving at the same conclusion, all the symptoms of aneurism being strongly marked. The patient accordingly came to the hospital on the following day, for the purpose of submitting to the operation necessary for the cure of the disease.

The following account of the case is chiefly taken from my house-surgeon, Mr Moir's hospital journal :—

Dennistoun Marshall, æt. 29, married, but living separate from his wife, admitted into the Infirmary November 17, 1851, on account of aneurism of the right axillary artery. Has been for the last four years employed as a japan-polisher,—an occupation in which continued active exercise of the right arm is required. He had formerly served for four years as a private in the 26th regiment in China, where he suffered severely from intermittent fever, from the effects of which, he thinks, his health has been permanently impaired. He states that he has never been free from cough since his return to this country. For the last three or four years he has led an irregular life, and about three years ago contracted syphilis, which was followed by the common train of secondary symptoms, sore throat, arthritic pains, skin eruption, and periostitis. Enlargement and induration of the cervical glands still exist, and his chest and back are still marked by a fading copper coloured eruption. He states that his cough was aggravated by his having caught cold in jail, where he had been confined for a month during last spring.

About the middle of June, after sleeping a whole night in the open air, and on damp grass, his cough became more troublesome, and he was seized with pain in the upper and fore part of the right side of the chest, and in the front of the shoulder, which was aggravated by taking a full inspiration. He did not apply, however, for medical advice, and continued at his employment up to within two days of his admission into the hospital.

Three weeks ago, he, for the first time, observed a swelling below the right collar bone, of considerably smaller bulk than the tumour which now occupies the subclavicular space. This swelling was not painful on pressure, and, as far as he is aware, was devoid of any pulsation. He did not pay much attention to it, and did not connect it in his mind with the pain of his arm till within the last three or four days, when the pain of the limb became much more severe, and he perceived a strong pulsatory movement in the swelling. He then for the first time applied for medical advice, when the nature of the tumour was recognised.

The symptoms which existed at the time of his admission into the hospital may be briefly stated as follows :—Severe and constant pain referred to the inner side of the right arm and fore-arm, but

chiefly around the elbow. A circumscribed pulsating tumour, of the shape and size of a turkey egg, situated immediately below the right clavicle. The tumour occupied the situation of the first stage of the axillary artery, projecting immediately below the clavicle, and extending to the axilla, where it could be felt by the fingers pressed behind the pectoral muscle. The integuments covering the tumour were not tense, but marked by the course of two or three large veins. On slight examination, its consistence appeared to be tolerably firm; but on steady moderate pressure being made with the hand, its fluid contents gradually receded, till the swelling was nearly quite effaced. It immediately re-appeared with an expanding pulsatory movement on the pressure being removed. Pressure on the subclavian artery above the clavicle in the same way speedily produced complete subsidence of the swelling, which again rapidly regained its former size on the finger being removed. On applying a stethoscope to the tumour, a loud *bruit de soufflet* was heard accompanying each stroke of the heart, and this was rendered more intense on allowing the tumour suddenly to re-fill after pressure being made on the artery above the clavicle. The brachial artery was felt pulsating feebly along the inner side of the arm, and the pulsation of the radial artery was scarcely perceptible at the wrist.

These symptoms being once distinctly recognised, I abstained from further manual examination, as the handling of the swelling gave him uneasiness, and as the size of the tumour appeared to be decidedly on the increase. My colleagues, Dr Dunsmure and Dr Gillespie saw him with me on the day following his admission into the hospital; but, on the above-mentioned account, refrained from making more than a very superficial examination of the tumour.

On examining the general state of the patient's health, his condition appeared to be unfavourable for the immediate performance of an operation. He had a depressed and anxious look. His pulse was about 90. His respiration was a little laboured, and he suffered from a constant tickling cough. The right side of the chest did not expand so freely as the left, and there was impaired resonance on percussion beneath the right axilla, extending for a considerable way back and in front, below the level of the tumour.

Under these circumstances, I requested my friend, Dr H. Douglas, to see the patient with me. Without entering into the details of the physical signs elicited on careful examination of the chest, I may mention, that Dr Douglas' report was favourable in so far as the state of the right lung was concerned. The cough appeared to depend on simple catarrh, of an unimportant nature; whilst the impaired resonance on percussion, and feebleness of respiration over a limited part of the right side of the chest, seemed to be the result of old disease (probably thickening) of the pleura. The action of the heart was regular, and its sounds normal; and no further disease of the vascular system could be detected. Under these circumstances, it appeared that the constitutional disturbance was

chiefly referable to the local disease, the aneurism. The state of the chest was not such as, in Dr Douglas' opinion, contra-indicated the propriety of immediate operation; and as the tumour was distinctly increasing in size, and had already reached the level of the clavicle, I proposed to place a ligature on the artery without further delay,—a proposal which was willingly assented to by the patient, who was most anxious for the immediate performance of the operation.

The operation was performed on 19th November in the usual way, a ligature being applied to the artery immediately to the outer side of the scalenus muscle. The operation was attended with unusual difficulty, from the number and size of the veins which crossed the triangular space,—a difficulty which was fully verified on post-mortem dissection of the parts. I was efficiently assisted, however, in the deeper part of the dissection by my colleagues, Mr Spence and Dr Gillespie, and the artery was, after some delay, reached and surrounded by a ligature, the sheath of the vessel having been freely exposed, but the coats of the artery denuded only to such an extent as to allow of the passage of the needle. The patient was in the recumbent posture during the performance of the operation, and did not inhale chloroform. He bore the operation admirably, and when it was finished he walked down stairs to his ward.

During the first five days succeeding the operation, everything progressed favourably. The pulse averaged from 72 to 88, and his cough was decidedly better. The aneurism had diminished to less than a third of its former size, and I repeatedly pointed out to the students of the hospital this unusually rapid subsidence of the tumour.

On the 24th (fifth day after the operation), the pulse was a little accelerated, and he did not feel quite so well. His cough, however, was better, and he made no special complaint.

On the evening of the 25th, he had an attack of shivering, followed by heat of skin and general fever; and on the 26th I found him labouring under acute general bronchitis, with a rapid and feeble pulse and considerable dyspnoea, with slight lividity of the lips. He was occasionally incoherent, his skin was covered with perspiration, and his sunk and anxious look was such that I did not expect he could survive long.

Under the free use of stimulants and opiates, together with the application of a large blister over the fore part of the chest, his condition improved; and on the 30th, under the kind and skilful management of Dr Douglas, his alarming chest symptoms had very much subsided. The dyspnoea and cough were greatly relieved, and his pulse had again fallen below 100, whilst at the same time it had improved in strength. The ligature was found loose on the dressings on this, the eleventh day following the operation; the wound having been entirely healed for two or three days previously, except at the point where the ligature protruded.



After this, he continued to improve steadily. On the 5th of December he was so well as to be able to be out of bed for half an hour. The wound was healed, with the exception of a point not larger than a pin's head, from which there was scarcely sufficient discharge in twenty-four hours to moisten the morsel of lint placed over it. The prominence of the tumour was almost entirely effaced, but it wanted the dense feeling of a solidified aneurism.

Since the day following the application of the blister to the chest, some enlarged glands had been felt in the axilla, indurated, and a little painful on pressure. There was now a larger and softer swelling to be felt deeper in the axilla, behind the pectoral muscle, which I thought probably depended on suppuration of some of the deeper glands, from the irritation of the blister, which was a large and exceedingly severe one, and still continued to discharge.

Early on the morning of 6th December, slight oozing of dark-coloured blood took place from the small opening in the middle of the cicatrix, but soon ceased spontaneously.

On the afternoon of the same day, a small jet of arterial blood again issued from the same point, but the bleeding was arrested by slight pressure.

On the 7th, at three A.M., the bleeding recurred to a slight extent. The cicatrix was now of a dark colour, and stretched by effusion of blood beneath it. Oozing of blood continued through the day in spite of careful compression and the continued application of cold.

At four o'clock on the morning of the 8th, a fit of coughing was suddenly followed by copious hemorrhage. On arriving at the hospital, I found the patient in a very weak state, having lost about a pound of blood. I learnt from Mr Moir that the whole adhesions of the wound were broken up, and that the hemorrhage was now restrained by a graduated compress, introduced to the bottom of the wound. The hemorrhage was in the meantime effectually suppressed. A few strips of adhesive plaster were drawn across the compress, to prevent its being displaced, and a bladder of ice was applied over the parts.

It was now evident that nothing but the application of a ligature to the subclavian, inside the scalenus, or to the innominate artery, could prevent the patient from speedily sinking from hemorrhage; but I need scarcely say, that the condition of the patient precluded all idea of resorting to such an attempt.

By the attention and constant watching of Mr Moir and my clerk, Mr Watson, no copious hemorrhage again occurred. The blood continued, however, to ooze in small quantity through the dressings; and the patient gradually sank, and died at three o'clock on the morning of the 10th December.

The body was examined on the following day. The entire parts concerned in the disease and wound over the clavicle were removed for careful examination. This was done by dividing the soft parts transversely in the upper part of the neck, downwards over the shoulder, and along the posterior border of the axilla. The trachea



and œsophagus were included within the incisions; the sternum divided longitudinally, and the three first ribs removed in connection with the parts.

In thus exposing the right side of the cavity of the chest, it was found that the lung was universally attached to the thoracic walls by old and firm adhesions, except from within a very short way from its apex to the level of the fourth rib. This space was converted into an abscess, which extended, about the same level, forwards as far as the costal cartilages, and backwards to within two inches of the angles of the second and third rib. The second rib lay bare, and at points eroded, in the cavity of this abscess for about four inches, as well as a small portion of the lower border of the first rib. The quantity of pus contained in this abscess appeared to be about four or five ounces. The abscess appeared to have had its origin between the walls of the thorax and costal pleura. This was thought probable, from the ribs and intercostal muscles being completely separated from the membrane, whilst the surface of the lung was still covered by a dense and thickened layer, formed apparently by the adherent and thickened costal and pulmonary pleura.

The tissue of both lungs was healthy throughout, except the upper part of the right lung, which did not crepitate on pressure quite so freely as other parts of the lung. The bronchi and their ramifications were universally slightly congested, and contained a considerable quantity of mucus. The heart was in all respects healthy, and no trace of disease could be detected in any part of the arterial system.

The parts concerned in the local disease were examined, by first exposing the wall of the cyst, and laying bare the artery upwards from beneath the origin of the large branches in the axilla. The cavity of the sac was then laid open by an incision through its anterior wall, in a line with the course of the artery. On doing this, about an ounce of pus escaped, mixed with one or two small recent coagula; and so little did the interior of the cavity present of the appearance of an aneurismal sac, that I was at once impressed with the idea that no aneurism existed, but that an error in diagnosis had been made; that the disease was simply an abscess, which had received a pulsatory movement from its contact with the artery. On reflecting, however, for a moment on the unequivocal nature of the symptoms, and on the speedy and great diminution of the size of the tumour after the application of the ligature, I was satisfied that this could not be the case.

On washing gently the inner surface of the cavity, it was seen that the greater part of its surface presented the loose flocculent appearance of an abscess; that a small portion of the lower border of the first, and the second rib to the extent of between three and four inches, were bare, and at some points rough, from destruction of their lamellated surface, and that a large communication existed in the second intercostal space between the cavity and the abscess

within the chest. Here and there the surface of the cavity (especially on its anterior wall) was lined by patches of fibrinous deposit, adherent to the walls of the cyst, and quite similar to the laminæ of fibrine deposited in the interior of the sac of an aneurism.

A probe was now introduced into the divided extremity of the artery below, and passed upwards with great gentleness till it had reached about an inch beyond the lower limits of the sac, when it at once passed into the cavity of the cyst. The probe was immediately withdrawn, and the opening in the artery was seen to be of an oval form, and about two lines in its longest diameter. The edges of the opening were well defined, but, as well as the arterial coats in its close neighbourhood, were soft, almost pulpy, and very thin. The opening and its edges, indeed, resembled in all respects the perforations of two arteries in my possession, which had given way into the cavities of abscesses, which had been opened a short time previously.<sup>1</sup>

On passing a longer probe into the artery from below, and avoiding the opening I have described, the coats of the artery were found to be entire for nearly an inch and a half beyond the opening. Here the passage of the probe met with an obstruction, which, however, was overcome without using much force, and the point of the probe, pushed gently forwards, entered the sac near its upper part.

As it was impossible to expose this second opening without further dissection, it was not so carefully examined as the lower opening, in order that an accurate sketch of the parts might be made before they were further displaced. On dissecting the artery further, after the parts had been for some time immersed in spirit, the tissues were found matted together in the walls of the abscess, and it was difficult to ascertain the precise condition of the parts. The artery was obliterated from within an inch and three quarters of the lower opening up to the point of ligature. The coats of the artery for half an inch below the obliterated portion were softened, and the canal of the artery contracted in size. The appearance of the opening in the vessel here was quite different from that of the lower perforation. It was evidently an artificial opening, and made by the probe at the point where its passage had been obstructed; but so slight was the force which had caused the probe to enter the sac, that I think a perforation had probably existed at this point, previously to the performance of the operation, and had been closed by the contraction of the artery, and by the recent effusion of lymph succeeding the application of the ligature. Of this, however, there is no certain proof.

On examining the wound over the clavicle, after it had been cleared of the coagulum, with which it was distended, it was found

<sup>1</sup> Perforation of the popliteal artery, already mentioned, and a perforation of the trunk of the lingual artery, in the cavity of an acute abscess of the pharynx, which had been opened four days previously to the occurrence of hemorrhage.

to have no communication with the aneurismal cavity, being separated from it by the subclavius muscle and costo-clavicular ligament, which remained entire. This had been rendered evident in the early stage of the dissection; had any communication existed, the blood, pent up by the plugging of the wound, must have escaped into the sac, which was not the case.

The artery was found quite disorganised above the seat of ligature. The hemorrhage had occurred from the proximal side of the point at which the ligature had been applied. A firm clot, of about half an inch in length in great part, but not entirely, filled up the canal of the vessel at this part, and adhered firmly to the walls of the vessel, except on its upper side, where an opening existed, through which a crow-quill might have been easily passed. The nearest branch to the point of ligature was the internal mammary, which was given off about three-quarters of an inch from the point at which the artery had been tied. The artery on the distal side of the point of ligature (as already mentioned) was obliterated and already converted into an impervious cord. It adhered intimately to the coverings of the rib, at the point where the ligature had divided the vessel.

Lastly, the veins running over the surface of the tumour and the trunk of the internal jugular vein, showed signs of recent inflammation, the canal of these vessels being partially obstructed by fibrinous deposit and coagula adherent to the walls of the vessel. The veins engaged in the wound over the clavicle did not present any morbid appearance. The subclavian vein was pervious between the upper margin of the first rib and its junction with the jugular vein, but was completely disorganised and divided at the point opposite the ligature of the artery. This had evidently been produced by the firm plugging of the wound for some days before death, by which the vein had been, along with the artery, forcibly compressed against the rib.

A remarkable variety existed in the position of the subclavian vein. It lay immediately below, and in contact with the artery, and behind the scalenus anticus muscle. It diverged from the artery behind the scalenus to join the internal jugular vein.<sup>1</sup>

An attentive consideration of these details can scarcely fail, I think, to lead to the conviction, that the aneurism was of the variety described by Mr Liston; that it owed its origin to ulceration of the coats of the artery, which formed part of the walls of an abscess.

Another view of the case, however, has been taken by some, who have examined the parts, and on whose opinion I place much reliance, viz., that the tumour was originally a spontaneous aneurism, and that suppuration of the sac had taken place, and given rise to the appearances which were found on dissection.

<sup>1</sup> As far as I am aware, two cases only of this variety of the vein have been previously recorded. Blandin.—*Traité d'Anatomie Topographique*, &c., p. 210. Velpeau.—*Traité Complet d'Anat. Chirurg.*, tome i. p. 494.



A third view of the case has been suggested, and which I consequently think it right to mention, viz., that the disease was simply abscess, and that the diagnosis of the case from first to last was erroneous.

There seems little difficulty in refuting this last opinion, which does not appear to me to be borne out by a single fact in the case, beyond the presence of pus in the cavity.

Following the view which I have adopted, the symptoms from which he suffered are easily accounted for in the order in which they occurred. In the month of June, after unusual exposure to cold from sleeping all night on the damp grass, he suffered from an aggravation of his cough, accompanied with pain high on the right side of the chest, and in front of the shoulder. These symptoms continued unabated, and, it seems reasonable to conclude, were produced by the formation of an abscess of the pleura, which was limited by extensive old adhesions of the lung to the walls of the chest. For four months he continued to suffer from these symptoms, and at the end of that period he for the first time perceived a swelling beneath the collar-bone, which gradually went on increasing in size, but, as far as he was aware, was devoid of pulsation. The matter within the chest, limited by the adhesions of the pleura, had made its way outwards through the intercostal space, and burrowed in the cellular tissue beneath the pectoral muscles. That the matter had been in contact with the ribs for a long period is proved, I think, by the bare, rough, and macerated appearance of the bones. The matter, in its further progress to the surface, made its way from beneath the pectoral muscles, and burrowed in contact with the axillary vessels in the highest part of their course, and the artery, thus lying bare in the cavity of the abscess, had at length given way, probably two or three days only before his admission into the hospital, the period at which he first observed pulsation in the tumour. The cavity of the abscess was thus suddenly changed, by its communication with the artery, into a false aneurism.

Taking the other view of the case, viz., that the aneurism was the primary formation, and that the sac had suppurated, it becomes a much more difficult matter to account for the changes which took place in the tumour during life, or for the appearances found on dissection. Inflammation of an aneurismal sac, in the first place, is attended by severe pain and constitutional disturbance, and by rapid increase in the size of the tumour; but, in this case, neither pain, increase in the size of the tumour, nor any signs of inflammation, occurred after the application of the ligature, the period during which, it is thought, suppuration occurred. On the contrary, the subsidence, the almost entire disappearance, of the tumour after the operation, was unusually rapid; and firm pressure over the seat of the swelling gave no pain.

Again, supposing the aneurism of the axillary artery to have been the primary formation, it is difficult to imagine how the pro-



gress of the tumour should have been towards the cavity of the chest, and not towards the surface below the clavicle, or downwards into the loose cellular tissue of the axilla. Such an extension of an axillary aneurism is quite unusual, and, I think, highly improbable.

In the next place, the interior of the cavity presented none of the appearances which are found in the cavity of a spontaneous aneurism, which had undergone suppuration. There were no broken-down masses of fibrin, nor appearance of concentric laminae, which are invariably present in such circumstances. On the contrary, there were, as in Mr Liston's case, only patches of fibrinous deposition adhering to the sac at one or two points.

Further, the opening of communication between the artery and the cavity presented none of the appearances of the opening of a spontaneous aneurism. It was not a thickened everted opening, with adherent fibrine, nor was there the slightest extension of the external or inner coats over the walls of the sac. On the contrary, the edges of the opening were soft and pulpy, and the perforation of the coats was abrupt and defined.

Lastly, spontaneous aneurism does not often occur without more or less general arterial disease; but in this case, with the exception of the right axillary artery, the arterial system was perfectly healthy throughout.

I have said that it had been suggested that the disease may have been a simple abscess, and that the pulsation may have been communicated from the neighbouring artery.

In answer to this supposition, it may be stated, in the first place, that the signs of aneurism were *most unequivocal*. One of the signs, however, in this case was not to be depended on, viz., the emptying of the tumour by pressure made on its surface. Supposing the disease to have been only abscess, the pressure would have caused the matter to recede into the chest through the intercostal opening. The removal of the pressure, however, was instantly followed by the peculiar expanding pulsation characteristic of aneurism, and was accompanied by a loud *bruit de soufflet*.

But one well-marked symptom was present, which alone precludes the idea of the disease being a simple abscess. Pressure on the subclavian artery over the clavicle not only arrested the pulsation of the tumour, it produced remarkable subsidence of the swelling,—so much so, that Mr Syme remarked, whilst compressing the subclavian artery alone with the finger, that “the tumour was gone.” This could not have occurred had the disease been a simple abscess. The tumour instantly refilled on removal of the pressure on the artery.

Lastly, if the tumour was only an abscess, the ulcerated opening of the artery must have taken place after the operation, at a time when the artery was collapsed and empty, and obliterated to within two inches of the opening.

This view of the matter is so extremely improbable, that I need scarcely say more to refute this opinion. Were further proof

wanted, it is to be found in the well-marked patches of fibrinous deposit adhering to the walls of the sac.

One feature of the case, as regards the ligature of the artery, is worthy of notice, viz., the occurrence of secondary hemorrhage so long as six days after the separation of the ligature, and at a time when the wound was firmly cicatrised, except at a point not larger than the head of a pin. The danger of secondary hemorrhage seems to be not only greater, but also to continue for a longer time, in the arteries, the current in which is so directly under the influence of the heart's action as those at the root of the neck. There was the additional unfortunate complication in this case of severe fits of coughing. But one cause of the hemorrhage in the present case, I think, was the application of a large blister to the upper part of the chest about the time of the separation of the ligature, which probably caused partial absorption of the newly exuded lymph, which closed the vessel, a risk which was fully estimated before the use of a remedy, which, however, Dr Douglas considered indispensable in the treatment of the bronchitic attack.

The importance of the subject is, I think, sufficient apology for my having entered somewhat minutely into the details of this case. Instances, in which pathological proof of this form of aneurism can be obtained, are necessarily rare, and it is, consequently, of moment that they should be carefully recorded.

There seems to be one important point in practice involved in the consideration of this variety of the disease, viz., the question of operative interference.

The ordinary Hunterian operation (the application of a single ligature to the artery between the aneurism and the heart) can, I think, scarcely be relied on with any degree of certainty to effect a cure of such an aneurism. There is not in these cases, as in spontaneous aneurism, the thick deposit of fibrinous layers within the sac, which rapidly increases in ordinary cases after the application of the ligature, till the tumour is filled by solid matter. On the contrary, the operation cannot be followed by solidification of the tumour, unless absorption of the purulent matter takes place,—an event which can scarcely be looked for in such cases. The matter, then, will make its way to the surface, and, unless the artery has been obliterated at the point of the ulceration of the vessel (which is a matter of uncertainty), hemorrhage will take place on the matter making its way through the integuments. The condition would be the same as that of an aneurism, which had undergone suppuration after the performance of the Hunterian operation: the collateral circulation in a state of increased activity, and bringing the blood freely round to the hole in the artery.

Were the character, then, of such an aneurism recognised during life, it appears to me that it would be better practice to treat the case like any other form of false aneurism, viz., by the performance of the old operation,—the laying open of the tumour, and the ap-

plication of two ligatures, the one above and the other below the opening in the vessel.

The prognosis, however, in such a case, under any circumstances, must be unfavourable; an artery involved in the cavity of an abscess not being in a condition favourable for the occurrence of the healthy changes necessary for its obliteration, by the application of ligatures in the neighbourhood of such an ulcerated opening.

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EXPLANATION OF PLATE.

- A A A A. The cyst.
- B. The axillary artery.
- C. The opening of communication between the artery and cyst.
- D. The second rib bare and rough.
- E E. Patches of fibrine deposited in layers on the interior of the cyst.
- F. Arteria innominata.
- G. Carotid artery.
- H. Subclavian artery on the proximal side of the seat of ligature; a probe passed through the vessel to show the source of the hemorrhage.
- I. Internal mammary branch.
- J. Transverse humeral branch.
- K. Omo-hyoid muscle.
- L. Scalenus anticus reflected.
- M. Internal jugular vein reflected.
- N. Sterno-mastoid reflected.
- O. Pectoral muscle cut across.









ON

# AMPUTATION AT THE ANKLE-JOINT

BY

## INTERNAL LATERAL FLAP.

BY

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[FROM THE MONTHLY JOURNAL OF MEDICAL SCIENCE, AUGUST 1849.]

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NUMEROUS objections have been brought forward against the tibio tarsal or ankle-joint amputation, as proposed by Mr Syme in 1842. But I believe the chief obstacle to its general adoption has been the difficulty of performing the operation. This objection has now in a great measure been removed. It is no longer found necessary to carry the incision across the sole so far forwards as at first practised by Mr Syme. The dissection of the integuments from the *os calcis* is thus rendered much more easy, and the risk of endangering the vitality of the flap, by injuring the vessels at its base, is in a great measure avoided. The operation as at first performed by Mr Syme was tedious and difficult, and I believe that the stretching required in separating the long flap from around the *os calcis* occasionally proved injurious to the vitality of the flap.

With a view of facilitating the performance of the operation, and at the same time of preserving the thick integuments of the heel, without incurring the danger of injuring the posterior tibial artery, either by the point of the knife, or by undue violence in separating the flap, I proposed the operation which I am now about to describe. These objects, I conceive, have since been attained by the modification which Mr Syme has made in his own operation; and I believe that the incisions now recommended and practised by Mr Syme will, in the majority of cases, be found best calculated to ensure the formation of a good and useful stump.

I am induced, however, to direct attention to the following mode of operating, from the fact that, in some cases, it appears to me to possess advantages over the other operation; whilst, occasionally,

cases may occur where the integuments of the heel may be saved to form a covering for the ends of the bones only by the following incisions:—

*On the Right Foot.*—The body reclining on the right side, and the foot and ankle projecting beyond the table with their internal aspect upwards, the point of the knife is entered in the mesial line of the posterior aspect of the ankle, on a level with the articulation, carried downwards obliquely across the *tendo achillis* towards the external border of the plantar aspect of the heel, along which it is continued in a semilunar direction. The incision is then curved across the sole of the foot, and terminates on the inner side of the tendon of the *tibialis anticus*, about an inch in front of the inner *malleolus*.



The second incision is carried across the outer aspect of the ankle in a semilunar direction, between the extremities of the first incisions, the convexity of the incision downwards, and passing half an inch below the external *malleolus*.

The flap is now dissected up, care being taken that the knife cuts close on the bones, so as to preserve the whole thickness of the soft parts. By holding the base of the flap between the fingers and thumb, as it is detached from the bones, all risk of wounding the artery at this stage is avoided. The foot is then severed at the articulation, and the ends of the *tibia* and *fibula* cleared so as to allow of the application of the saw, by which a thin slice of the extremities of these bones is removed, as in Mr Syme's operation.

This operation is very easily and rapidly performed, and, with a very moderate amount of care on the part of the operator, the artery runs no risk of being injured. It is in clearing the ends of the *tibia* and *fibula* for the application of the saw in this, as well as in Mr Syme's operation, that the artery is, I believe, in the greatest danger of being wounded. It is avoided by cutting close on the bones,—a point to be attended to during the whole dissection in either operation.



The operation on the left foot is the same; but, as the patient reclines on the left side, the order of incision is reversed, the knife being first entered at the point above indicated, in front of the inner *malleolus*.



M. Sédillot, of Strasbourg, has since recommended a similar method of performing the operation. The incisions made by M. S. scarcely differ at all from those I have recommended; but their order is reversed, the first incision being made on the fibular aspect of the foot, the articulation opened, and the flap cut from within outwards. I have amputated in the manner I have described in two cases of disease of the tarsus, and my colleague, Dr Douglas Maclagan, has performed the same operation three times. The results of the cases have ultimately proved satisfactory, although in one the cure proved tedious from the long continuance of sinuses around the stump; and in another gangrene of part of the flap took place, from the posterior tibial artery having been accidentally divided in clearing the ends of the *tibia* and *fibula*. In both, however, a satisfactory result was ultimately obtained.

The accompanying sketch represents the form of the stump which is left, which, it will be observed, differs from that formed by Mr Syme's operation only in the situation of the cicatrix, which is here on the fibular side of the stump. With an artificial foot, the patients are able to walk with ease, and but slightly perceptible lameness, the weight of the body resting on the face of the stump.



It has been objected to the operation by internal lateral flap, that the vitality of the flap is endangered from the external lateral vascular connections—(viz., the terminal ramifications of the external malleolar and interosseal branches of the peroneal artery)—being divided. I feel satisfied that no apprehensions need be entertained on the ground of a deficiency of vascular supply. Numerous branches of the posterior tibial artery, of considerable size, are distributed in the substance of the flap, usually requiring the application of seven or eight ligatures at the time of the operation.

The cases in which I think this operation may with advantage be substituted for Mr Syme's method are,—1st, Those in which the integuments on the outer side of the ankle are in an unsound state, either from disease or injury; 2d, In elderly persons, whose arteries are not well suited to bear with impunity the stretching which occasionally occurs in separating the integuments from around a projecting heel; Lastly, it may, from the ease with which it is performed, be preferred by those who have not the frequent opportunities of operating on the dead body, which are requisite for enabling them to perform the other operation with facility.

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April 1852.—Subsequent experience of amputation through the *malleoli* has satisfied me that the operation, as performed by Mr Syme,

(provided the incision is not carried further forwards in the sole than in a straight line drawn between the extremities of the *malleoli*), is in the great majority of cases the preferable proceeding.

It is well to know, however, that an excellent stump may be formed by the incisions above described, as in many cases of injury the operation is the only available mode of removing the limb at so low a point.

# CASE

## OF

# STRICTURE OF THE URETHRA,

IN WHICH THE OPERATION OF DIVISION OF THE STRICTURE BY EXTERNAL  
INCISION WAS FOLLOWED BY A FATAL RESULT.

BY

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[FROM THE MONTHLY JOURNAL OF MEDICAL SCIENCE FOR MARCH 1851.]

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THE following account of this case was read at a meeting of the Medico-Chirurgical Society, on the 15th of January. The details of the case are given partly from short notes of my own, but chiefly from a very accurate report of the case made by my house-surgeon, Dr Harley, in the hospital journal :—

Andrew Cree, a labourer, æt. 41, was admitted into the Royal Infirmary, under my care, on the 4th December last, labouring under stricture of the urethra.

He stated that he had been treated for stricture twelve years before, and that, under the use of bougies, which were occasionally passed for about a twelvemonth at that time, his condition was so much improved that he suffered little annoyance from the stricture.

He remained tolerably well for two or three years, when the difficulty of voiding his urine began to increase, and for the last two years his symptoms had been much more urgent than at any previous period.

At the time of his admission into the hospital, the calls to void his urine were nearly constant, day and night, and his water was passed (frequently involuntarily) either in drops or in a very small spiral stream.

On the day of his admission, I examined his urethra, and found a stricture, about three inches from the orifice of the urethra, through which I was unable to pass the smallest-sized instrument.

On the 6th (two days afterwards), I passed No. 1 bougie into the bladder, and found that a second stricture existed at the bulb. Around each stricture a considerable degree of induration existed. The induration anterior to the scrotum appeared to extend along the urethra for about an inch, but was most strongly marked about three inches from the orifice of the urethra, where a narrow band seemed to grasp the instrument tightly.

On the 9th I passed No. 2, and on the 15th No. 3,—each time with very considerable difficulty, the instrument, after being passed into the bladder, being so tightly grasped as to require a considerable amount of force to withdraw it.

The condition of the patient was now greatly improved. He was able to retain his urine perfectly, and did not pass it oftener than twice or thrice in the twenty-four hours, and in a tolerably good stream.

After each instrument was passed, however, he suffered from long continued rigors, which were generally followed by slight temporary febrile disturbance. On one occasion I was obliged to suspend the use of the bougie for four or five days, on account of one of these febrile attacks.

Between the 15th and 31st December, I repeatedly attempted to pass No. 4 bougie, but invariably failed in passing it through the anterior stricture, although as great a degree of force was employed in the attempt, as appeared to me justifiable. No. 3 was several times passed into the bladder, but was grasped on each occasion as tightly as at first. The induration around each stricture remained undiminished.

Under these circumstances, the case appeared to me to be one peculiarly suited for the operation proposed by Mr Syme—the division of the urethra, upon a grooved director, by external incision.

The patient having acceded most willingly to the proposal, I had a grooved staff made of the size of No. 3 bougie, and ascertained by one or two trials that it could be passed through both strictures into the bladder.

On 31st December, the patient being, as far as I could judge, in an excellent condition for the performance of the operation, retaining his urine for ten or twelve hours at a time, his tongue clean, and his pulse natural, I performed the operation in the presence of Mr Syme and my other colleagues in the hospital.

The grooved staff being introduced into the bladder, the patient inhaled chloroform, and was placed in the usual position as if for the operation of lithotomy. I made an incision, about an inch in length, over the anterior stricture, and after feeling the groove of the staff through the urethra behind the indurated constriction, I inserted the point of the knife at this point, and ran it forwards along the groove, dividing the constricted portion of the urethra till the resistance offered to the knife was entirely overcome. The extent of this stricture was greater than I had expected, the indurated part of the



canal, which I divided, being fully an inch in length. To make sure that I had divided the whole stricture, I slid a director gently both backwards and forwards along the groove of the staff at the extremities of the incision. The bleeding from this incision was very trifling (I should think not above half an ounce). I then made a second incision over the situation of the bulb, of about an inch and a quarter in length, and proceeded in the same manner, entering the knife behind the induration around the stricture, and passing it forwards till the resistance offered by the indurated tissues to the edge of the knife was overcome. The extent to which the urethra was divided in this incision was about half an inch. I then withdrew the staff, and introduced No. 8 catheter into the bladder, and satisfied myself that it slid freely backwards and forwards along the urethra. The catheter was retained in the bladder by the usual fastenings, and the patient was removed to his bed. The bleeding which took place from the second incision was more copious than from the first; but the blood lost during the operation, from beginning to end, did not altogether exceed four ounces. The bleeding continued for a little after the patient was put into bed, but its amount was very trifling, and it soon ceased spontaneously. A plug was placed in the mouth of the catheter, and withdrawn occasionally by the patient to allow the urine to escape.

On the following day, at the hour of visit, he was remarkably well; he had slept well during the night, and had no complaint of any kind.

On the 2d of January (the second day after the operation) I withdrew the catheter; the patient was as well as on the previous day.

On the 3d, I found that he had had a slight rigor in the morning, which had been followed by a little febrile disturbance. At the hour of visit, however, he seemed to be going on quite well. His pulse 78, and soft, and the urine passing freely, both by the posterior wound and by the natural outlet. Both wounds had a perfectly healthy appearance.

About ten o'clock in the evening, I received a message from Dr Harley, saying that some alarming symptoms had suddenly made their appearance. On going to the hospital, I learnt that during the afternoon he had had a severe attack of shivering, after which he complained of giddiness, and his countenance assumed a look of anxiety. It was not, however, till the evening, about nine o'clock, that any alarming symptoms made their appearance. He then suddenly became pale, his features contracted, his pulse very rapid, and scarcely perceptible at the wrist. When I saw him at ten o'clock, he had all the appearance of a patient suffering from the shock of a severe injury; he was quite sensible; the surface of the body was cold and clammy; his features shrunk; the pulse was scarcely perceptible at the wrist; he complained of a choking sensation, and had all the aspect of a dying man. He had passed water freely in the afternoon; there was no distension of the bladder; both the wounds

had a perfectly healthy appearance; there was no swelling in their neighbourhood; no swelling or induration of the perineum, or in the prostate, when examined by the rectum. The sheets were stained by a few drops of blood from the wound in the perineum. Warm bottles had been placed around him, and brandy had been freely administered. I desired that this treatment should be continued, and that he should take in addition some camphor mixture with carbonate of ammonia.

In a few hours he had rallied somewhat; his pulse became more perceptible, and he felt better.

At visit the following day he was better; his pulse very rapid, but quite perceptible at the wrist. He had passed water freely, but in small quantity, both by the wounds and the natural outlet. Mr Syme saw him with me, and, with myself, was satisfied that nothing could be detected in the perineum to account for the constitutional symptoms. The wounds had the same healthy appearance as on the previous day. The same treatment was continued, and he improved a little during the afternoon, till about four o'clock, when he again suddenly sank into the same state of collapse as on the previous evening; and, in addition to his previous symptoms, the stomach now rejected all fluids as soon as they were swallowed. Sinapisms were applied to the epigastrium and to the calves of the legs. On visiting him about eight in the evening, I found that the vomiting had continued constantly since the afternoon, and had not been in the least degree checked by creasote and some other remedies which had been given. He was now evidently dying. The whole surface of the body was perfectly cold; the pulse was not perceptible at the wrist, and scarcely so at the axilla; his breathing was laboured and very rapid, and his breath cold; he had constant hiccough, and vomiting of a dark greenish-coloured fluid; his countenance was sunk, and he had very much the appearance of a patient in the last stage of cholera.

Being at a loss to account in any way for the presence of these symptoms, it occurred to me that, if it were possible to maintain his strength for a time, he might still rally from the state of prostration in which he now was, and the only means by which it appeared to me that this object could be attained was transfusion. In this opinion Dr Graham Weir, who was with me, concurred; and, with his assistance, from ten to twelve ounces of blood were safely transferred from one of the porters of the hospital into the veins of my patient. The effects of the transfusion on the patient were immediate, though not strongly marked. He said immediately that he felt "warmer and stronger," and in a short time his pulse was felt at the wrist, regular, and about 126 in the minute. The vomiting became less urgent, but again returned towards morning, and continued till the following afternoon.

On the following day (the 5th), at the hour of visit, his extremities were still cold, and his pulse of the same frequency, and weak. He

had passed a small quantity of urine by the wound voluntarily, and without difficulty.

On the 6th, his appearance was decidedly improved. His pulse was 100, regular, and much stronger. He had still, however, a good deal of hiccough, and his countenance had an increased look of anxiety.

In the evening his pulse had fallen to 88 ; his tongue was clean and moist ; he had taken some nourishment with relish, and had passed a larger quantity of urine freely by the natural outlet. The healthy appearance of the wounds continued, and the perineum and prostate were free from swelling or induration.

On the following day (the 7th), I found him much worse. His pulse was rapid and irregular ; his tongue brown and dry ; the surface of the skin over the whole body was of a bright scarlet hue ; there was suppression of urine, with muttering delirium, and *subsultus tendinum*. He gradually sank, and died at eight P.M. on the 7th (the eighth day from the performance of the operation, and three days after the transfusion).

A *post-mortem* examination of the body was made by Dr Gairdner on the following day.

The abdominal organs, including the kidneys and ureters, were healthy without exception.

The skin being reflected from the genital organs, the penis was divided about two inches from its orifice, the pubes sawn across on each side, and the whole urinary organs removed. The surface of each wound in the urethra had a gray sloughing appearance, which, however, was confined to the immediate neighbourhood of each wound,—there being no suppuration or sloughing of the texture of the *corpus spongiosum* or bulb, or in the cellular tissue immediately surrounding these parts. The deep perineal fascia, and the textures around the *levator ani*, were free from any morbid appearance. The anterior incision of the urethra was from an inch and a quarter to an inch and a half in length—the posterior about half an inch. These incisions were found, on laying open the urethra, to correspond in length to the extent of the constricted portions of the urethra,—the anterior stricture being an inch and a quarter in length, and much narrower at one point at its anterior extremity, than in the remaining part of the stricture—the posterior stricture occupying the situation of the bulb, and about half an inch in length. A considerable degree of induration still existed in the submucous tissues around each divided stricture.

The portion of the urethra between the posterior stricture and the bladder was very much dilated ; and the muscular fibres around the membranous portion of the urethra were strongly developed, giving this portion of the urethra somewhat of the fasciculated appearance presented by the inner surface of the bladder in this as well as other cases of old-standing stricture of the urethra. The prostate and tissues surrounding it were perfectly healthy. The



plexus of veins between the *levator ani* and prostate were carefully examined, as well as the veins in the neighbourhood of the incisions in the urethra, but were not found to present any signs of inflammation. The bladder was contracted and empty. Its mucous coat was here and there slightly congested, and especially at one point at its *fundus*, apparently from its having been in contact at this part with the point of the catheter. The muscular coat of the bladder was strongly developed, being uniformly about half an inch in thickness. In the substance of the muscular wall, above the peritoneal reflexion, on the posterior surface of the bladder, and a little to the right side of the mesial line, an abscess existed, containing fully a drachm of healthy pus. The posterior wall of this abscess was formed by the peritoneal covering of the bladder. On examining the pelvic viscera before they had been removed from the body, some slender and soft bands of lymph were observed uniting the most prominent part of the wall of this purulent collection to the peritoneal covering of the rectum. Lymph was also exuded on a small spot of the mucous membrane of the bladder, as well as in the sub-mucous texture forming the anterior wall of the abscess. A similar but still smaller exudation of lymph existed on the mucous membrane, a little below the opening of the ureter.

On opening the chest, about a quart of purulent fluid was found in the cavity of the right pleura, both surfaces of which were coated to the thickness of about a quarter of an inch with soft yellow lymph. The right lung was mostly flaccid and partially compressed, but presented several condensed nodules and points of congestion, which yielded a sero-purulent fluid on pressure. The largest of these condensed nodules was about an inch and a half in diameter, very deep purple externally, but presenting at its centre the grayish colour usually seen in the first stage of the secondary deposits, which take place as a consequence of purulent infection. On sections being made of the left lung, it showed a few small points congested and partially solidified, yielding on section a frothy purplish gray fluid.

I have been further informed by Dr Gairdner, that the blood in the ascending *vena cava*, when examined under the microscope, was found to contain structures similar in appearance to true pus corpuscles, and that a loose decolorised clot, found in the left auricle, and having an unusually granular opaque appearance, was found to contain similar corpuscles in large quantity. In both these situations, these bodies very much exceeded in numbers the ordinary proportions of white corpuscles in the blood.

On examining the wound at the bend of the arm, the edges appeared everted and slightly callous,—having likewise a grayish discoloured appearance. All the tissues around the immediate edges were perfectly healthy. The whole of the superficial veins throughout the arm were carefully examined, but neither their internal membrane, nor the blood within them, presented the slightest appearance of disease.



I need not apologise for having entered somewhat minutely into the details of this case, which I have considered it my duty to lay before the Society.

Its bearing upon the value of the operation proposed and advocated by Mr Syme, must be judged of by those who have watched its progress, and who have now heard its details. I can only say for myself, that it will not deter me from repeating the operation in similar cases.

It must be said of this, I think, as well as of all other operations, however trifling, that it is not free from dangerous consequences. It is well known that small operations, such as the removal of a finger or toe, the excision of small tumours, and incisions of all kinds, have repeatedly proved fatal, and this most commonly from the complication which proved fatal in this case,—the absorption of pus into the circulation.

The disease for which the operation is performed (confirmed stricture of the urethra) is one of a most distressing kind,—one which itself frequently proves fatal, and which, under the ordinary means of cure, is a tedious and frequently unsatisfactory subject of surgical treatment.

The operation, in the case I have related, has, it is impossible to deny, been directly productive of fatal consequences. It was performed at a time when the urinary irritation, produced by the disease, had been overcome by the partial dilatation of the urethra, and when the patient, as far as I could judge, was in a most favourable state for the performance of an operation. The operation was performed, and the after-treatment conducted, on the principles laid down by Mr Syme, and which have been followed, in his hands, with so much success.

With regard to the transfusion, I must state that, had I known that the symptoms which existed were the consequences of *pyæmia*, I should not have thought of adopting such a measure. I resorted to transfusion when at a loss to assign any distinct cause for the state of extreme prostration which was present; and I think no one who had seen the condition of the patient on the night of the 4th, could doubt that the effects of the transfusion were to prolong his life during the three following days.



# ON RESTORATION OF THE UPPER LIP.

BY

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*(Read at Meeting of Edinburgh Medico-Chirurgical Society, on July 9th 1851.)*

WHILST the lower lip is a common seat of malignant disease, and its removal, in part or in whole, consequently an operation which is frequently performed, the upper lip is rarely the seat of cancer or other disease requiring removal by the knife.

To remedy the deficiency produced by the loss of the lower lip, various modes of operative procedure have been recommended, whilst, from cases of deficiency of the upper lip being comparatively rare, much less attention has been bestowed in attempts to restore the lost parts in this situation.

Blasius, Dieffenbach and others have successfully restored the lost upper lip by flaps, cut in different ways, from the cheeks; and in cases, where the upper lip alone has been destroyed, it will not require much ingenuity on the part of the surgeon to effect the restoration in one of these ways.

In cases of harelip in which the cleft was unusually wide, so as to amount nearly to absence of the upper lip, the edges of the wide cleft have been allowed to be brought into apposition by cutting through the whole thickness of the cheek, in a line curved upwards from each angle of the mouth. I have resorted to this proceeding, and have more than once seen it successfully practised by others, in cases of deficiency of the greater part of the lip, when the soft parts in the situation of the cheek were in a sound condition.

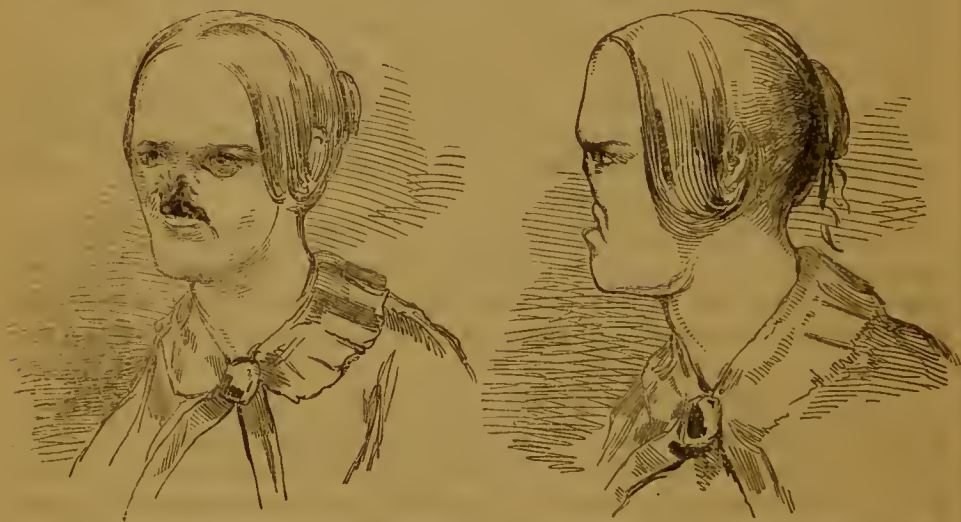
These modes of operation are suited for cases where the upper lip *alone* is deficient, and in which the cheek has not been involved in the injury or disease by which the parts have been destroyed. One

of the most common causes, however, of destruction of the soft parts of the face is *cancrum oris*, as well as the mortification which occasionally attacks these parts during fever and the eruptive diseases of children, and in such cases the cheek seems rarely to escape the ravages of the disease.

Two such cases have lately presented themselves in the hospital, in both of which, from the destruction of the cheek which had taken place, it was impossible for me to restore the lost parts by any method, as far as I know, hitherto practised; and it is to the plan which I have adopted in these cases that I am anxious to direct attention. It has proved in the following case successful in removing the extreme deformity which existed, and promises, I think, in similar cases, to answer the purpose in view satisfactorily.

The subject of the first operation was a girl, of eighteen years of age, who, when between two and three years of age, lost her entire nose, nearly the whole of the upper lip, and the greater part of the right cheek, from mortification, the sequela of an attack of fever. She subsequently grew up a strong and healthy girl, and was in the enjoyment of excellent health when she entered the hospital (12th March 1851) with the determination to submit to anything which could be done for the removal of her excessive deformity.

The following sketches give a good representation of the appearance presented by her face. The hard palate was widely cleft from



exfoliation of the superior maxillary bones, which had taken place in nearly the whole extent of the roof of the month. Her articulation was very indistinct, and, as she spoke, her tongue protruded through the opening of the alveolar arch. The remains of the right cheek were drawn in by a thin cicatrix, which adhered to the superior maxillary bone above the angle of the mouth. The integuments of the brow were ample, and in excellent condition for the formation of a new nose; and the only difficulty lay in the restoration of the lip,



which evidently could not be effected by incisions, however extensive, through the remains of the cheek.

The only plan by which it appeared to me the lost parts could be restored was, *the transposition of the lower lip to the situation of the upper*, whilst, at the same time, by extending the incisions under the base of the jaw, the integuments in that situation might be brought up to replace the lower lip, according to the plan recommended and successfully practised by Mr Syme. The incisions required to effect this were pretty extensive; but it appeared to me that any measures, however severe, were warrantable, if they held out the prospect of at all effacing the hideous appearance which the girl presented, whilst she herself was most willing to submit to anything which was likely to effect this end.

The operation was performed (19th March) in the following manner:—After removing a slice from the free border of the remains of the upper lip on the left side (Fig. 1, A A), and freeing this part from its adhesions to the gum, I made a curved incision

Fig. 1.

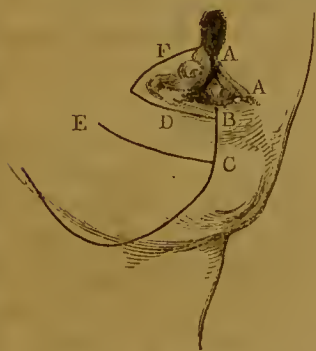


Fig. 2.

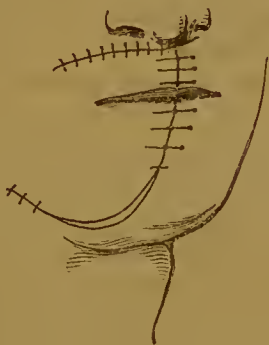


Fig. 3.



(E C) from about an inch outside the angle of the mouth through the whole thickness of the lower lip to about its centre, and parallel with the border of the lip. A second incision (B C) was then made, at right angles with the termination of the first, and prolonged downwards under the base of the jaw, in the manner practised by Mr Syme in the restoration of the lower lip. The *prolabium* of that part of the lip included in the incisions was then removed, and a cut surface (F) made in the natural situation of the base of the upper lip, by removing the cicatrix from the nostril to the right angle of the mouth. The two flaps formed by these incisions were then dissected fully back, and the bleeding vessels were secured by ligature. The upper flap was then raised and united (as shown in the diagram, A A, to B C, and D to F) in the situation of the upper lip, whilst the lower and larger flap was brought up and united to the cut surface of the lower lip and chin.

The right half of the lower lip was thus made to occupy the situa-

tion of the upper, whilst its place was supplied by the flap from beneath, and the right side of the mouth was now formed by the incision (E C) between the two flaps.

Fig. 2 explains the position of the parts when united in their new situation.

The operation was tedious and embarrassing from the unsteadiness of the patient, owing to the extreme difficulty of bringing her under the full influence of chloroform,—a difficulty which was experienced previously in removing two projecting teeth, and equally so afterwards in the operation for the restoration of the nose. She suffered from very little constitutional disturbance, however, and perfect union of the parts was obtained in the course of a few days.

A new difficulty, however, presented itself in the contraction of the mouth, which, in spite of all endeavours to prevent it, went on till the entire granulating surfaces of the two flaps had united. This contracted state of the mouth was afterwards obviated to a considerable extent by an incision, in which the integument and mucous membrane were divided at different levels. The mucous membrane was then everted and united to the skin, so as to form a *prolabium* for the upper lip, whilst the skin was similarly inverted and united to the mucous membrane of the lower lip. The mouth was thus enlarged; but a small portion of the lower lip was unfortunately lost by sloughing, which has left a slight permanent deficiency at the lower part of the angle of the mouth.

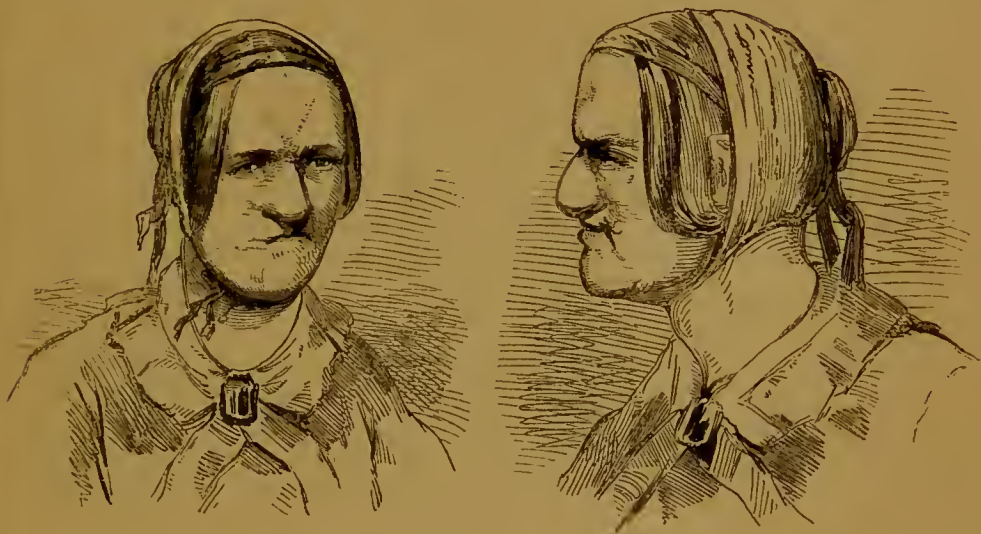
About ten weeks after the first operation, when the parts were firmly cicatrised in their new situation, the nose was restored by bringing a flap from the brow. The operation was performed in the usual way, with the exception of the *columna* being taken from the scalp, according to the Indian method. This was done, as it was thought better not to interfere further with the new lip, which would have been considerably diminished in size by raising a *columna* from its centre.

About a month after the formation of the nose, the collateral circulation of the new organ being well established, I divided the twisted neck of the flap, and attached it in the usual way.

The sketches at p. 5 show the result of these operations. The front face is from a daguerreotype, which, with a sketch of the profile, was taken five months after the formation of the lip, and three months after the restoration of the nose. The nose appears large,—a fault which, I need scarcely add, is unlikely to be permanent.

The chief difficulty met with in the progress of the case arose, as I have observed, from the obstinate contraction of the mouth; and the error committed in the operation, which gave rise to this difficulty, consisted evidently in the removal of the *prolabium*. This inconvenience, I have since found, may be avoided by preserving the *prolabium* of the lower lip in its situation, and uniting it to the flap brought up from over the base of the jaw.

The lines in Fig. 3 will serve to explain the situation of the incisions by which this object is attained; and if the method of operation I have described is thought worthy of performance, this modification of it (the preservation of the *prolabium in situ*) will be found of the greatest advantage in obviating the contracted state of the mouth.



The second case, in which a somewhat similar operation has been performed, was that of a girl, of eight years of age, who, when two years old, suffered in a similar way to the preceding case, from mortification of the face during fever. The same parts were destroyed as in the case I have related; but the left half of the upper lip had retained its vitality. The whole of the soft parts, however, between the eye and the lower lip had been lost, a small portion of the lower eyelid at the outer angle only remaining. From the contraction during cicatrisation, the remains of the angle of the mouth had been drawn upwards close to the eye. The nose, too, had been entirely destroyed. In this case I attempted to restore the lost parts by bringing up a large flap, consisting of the lower lip (saving the *prolabium*, as in Fig. 3), and integuments over the base of the jaw, so as to fill up the whole gap at once; but the result of the operation was unsuccessful, from an unforeseen accident. From the effects of the chloroform, which had been administered pretty freely during the time of the operation, the poor child vomited, with little cessation, for thirty-six hours. From the long-continued drag thus made on the sutures, union failed in the entire extent of the wound, and the flap, in spite of all means used to keep the edges together, gradually retracted and receded from the surface to which it had been attached. By a second operation, however, the flap was united to the remains of the upper lip. The upper lip has thus been completely replaced, and, from the preservation of the *prolabium* (as

shown in Fig. 3), the natural size, position, and appearance, of the mouth has been entirely restored.

The restoration of the eyelid and a small part of the cheek, which are still deficient, may in this case be accomplished without much difficulty; whilst no obstacle exists to the formation of a new nose by a future operation.







ON

# EXCISION OF THE KNEE-JOINT.

BY R. J. MACKENZIE, F.R.C.S.ED., ETC.

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HITHERTO an impression most unfavourable to the performance of the operation of excision of the knee-joint appears to have been entertained generally by the profession; and severe censures have been passed on those who have, within the last three years, revived the operation, as well by those who practically are quite ignorant on the subject, as by those whose experience and professional standing entitles their opinion to attentive consideration.

My own experience on the subject has as yet been too limited to warrant my speaking with any degree of confidence as to the result of the operation. I have performed the operation in two cases, but although the results of these cases hitherto have fully realised my expectations, yet the number is too small, and the time which has elapsed since the operation was performed is too short, to allow much weight to be attached to my personal knowledge of the operation. I have been induced, however, to write the following short notice of the subject by the conviction, from what I have lately seen of the results of the operation in several cases where it has been less recently performed, that the operation is one which has been rejected from surgical practice on insufficient grounds, and that it will yet come to supersede, in many cases, the severe operation of amputation of the thigh.

In order to enable us to arrive at a rather more definite conclusion than hitherto, as to the propriety of the operation, I propose to give a short account of the few cases in which, as far as I know, the operation has been performed.

The operation was first brought prominently before the profession by Mr Park of Liverpool, in 1783. It had been previously performed successfully by Mr Filkin of Northwich, but no satisfactory record

of Mr Filkin's case exists. Mr Park, in speaking of the result of his first case, says that a year after the operation his patient "was able to walk with great ease and firmness, without even the assistance of a stick, or of any kind of splint to support the union," "the foot being three quarters of an inch shorter than the other one." Seven years later Mr Park gives this additional account of the same case:—"To the history of the case of Hector M'Caghen, I have now to add, that he afterwards made several voyages to sea, in which he was able to go aloft with considerable agility, and to perform all the duties of a seaman; that he was twice shipwrecked, and suffered great hardships, without feeling any further complaint in that limb; but was at last unfortunately drowned by the upsetting of a flat in the river Mersey." Mr Park repeated the operation, but his second case proved less fortunate, the patient, a very unfavourable subject for the operation, having died about four months after its performance.

Moreau, some time afterwards performed the operation in three cases. Of his first case he says:—"At the end of the third month the consolidation of the bones was such that I left the limb at liberty in bed; the patient moved it about at his pleasure; in short, I flattered myself that I should be able to make him walk upon crutches in a month or six weeks; but an event, with which my operation had nothing to do, deprived me of that satisfaction. Epidemic dysentery of a fatal kind appeared in the hospital, by which the patient was attacked, and from which he sank three months and a half after the operation. "This unfortunate accident," says Moreau, "deprived me of the pleasure of enjoying the fruits of my care; but I remain convinced of the utility of the operation, and persuaded of the propriety and necessity of performing it in similar cases. I looked on my patient as cured, for I had no relapse to dread." In Moreau's second case the operation proved fatal. In a third case by the younger Moreau, the result was more fortunate, the patient recovering with a serviceable limb.

In 1809, Mulder excised the knee-joint of a pregnant female. Two months after the operation she was delivered of twins, and some time afterwards died from tetanus.

The next notice of the operation is by Mr Crampton, in 1823. The operation in Mr Crampton's first case can scarcely be said to bear on the question of excision of the knee-joint; not only were the patella and part of the tibia removed, but upwards of six inches of the thigh bone were taken away. The patient, however, lived upwards of three years after the operation, and then died from phthisis. Mr Crampton, in his remarks on the case, says, that it "was one to which the operation of excision was not applicable." The disease had proceeded too far; for, even had it been possible to have removed the whole of the diseased bone, and that union had taken place between the femur and tibia, the limb, from its shortness, would have been useless. The operation was performed in the



same year in a second case by Mr Crampton. The girl, although a most unmanageable patient, made an excellent recovery. Six months after the operation, the femur and tibia were consolidated by a firm bony union. Eight months later, she is reported as being able to walk a distance of nearly five miles at once; and upwards of three years after the operation, Mr Crampton says:—"I have examined the limb, and find that the femur and tibia are firmly consolidated; the leg and thigh are not in the slightest degree wasted, but the limb is considerably bowed outwards; she wears a shoe with a cork sole four inches thick; and, to use her own expression, 'is able to stand or walk the length of a day.'"<sup>1</sup>

The operation was next performed by Mr Syme, who, in 1829 and 1830, excised the knee-joints of two children, of seven and eight years of age. Up to this time the operation had only been performed in adults. The result in the second case was unsuccessful, the child having died about ten days after the performance of the operation. Writing in 1831, Mr Syme gives the following satisfactory account of his first case:—"In the course of four weeks after the operation, the wound was all but healed, and the limb, before the expiration of three months, had regained so much strength, that the patient could make some use of it in walking. It has been progressively improving since, and is still doing well. I have no doubt that ultimately it will be nearly as useful to him as ever; but even at present he would be very sorry to exchange it for a wooden one. He can walk and run, though with a halt, without the constrained appearance of a person with an artificial leg, and merely requires the *heel* of the shoe to be two inches higher than the other. The limb is stout and well nourished, and though slightly bowed outwards, does not occasion any disagreeable deformity; it allows a slight degree of flexion and extension." Seventeen years later, however, a much less satisfactory account of the same patient is given. In speaking of excision of the knee-joint, in 1848, Mr Syme says:—"I tried the operation nearly twenty years ago on a boy, who recovered perfectly from it, and seemed at first to possess a limb little inferior to its fellow, except in so far as it was stiff at the knee. But in the course of time it was found that the growth of the two limbs was not equal, and that the one which had been the subject of operation, gradually diminished in respective length, until it wanted several inches of reaching the ground, when the patient stood erect."

After Mr Syme's experience in 1830, the operation seems, as far as I can ascertain, to have been abandoned till within the last three years. The results of the operation on the whole had been decidedly

<sup>1</sup> I quote this from a work published eight years after the performance of the operation (Syme on "Excision of Diseased Joints," 1831). I understand, however, that the bones in this case yielded so much afterwards, that ultimately they were ankylosed at a right angle, a result which ordinary precautions, on the part of either patient or surgeon, might certainly have averted.

unsatisfactory. Of eleven cases in which it had been performed, six had died, and five had recovered. Of the fatal cases, however, some at least may be said to bear little on the merits of the question of excision, Mülder's case for instance, where the patient was far advanced in pregnancy when the operation was performed, and died of tetanus after parturition; and Mr Crampton's case, in which, although between six and seven inches of the thigh bone were removed, and the disease not yet eradicated, the patient lived for more than three years, and ultimately died from tubercular phthisis. The *epidemic* dysentery, however, which carried off Moreau's first case, cannot, I think, be altogether looked upon as an accidental occurrence, diarrhœa and gastro-enteritis being, as is well-known, a common cause of death after all severe operations. The result in the remaining three fatal cases was attributable in each case to the direct effects of the operation. Of the five cases which had recovered, the limb appears to have been thoroughly serviceable in three; the amount of usefulness of the limb in the fourth is unknown, and in the fifth case (Mr Syme's) the limb was ultimately useless.

In 1850, the operation was revived by Mr Fergusson; and within the last three years the operation has, as far as I can ascertain, been performed thirteen times: in three cases by Mr Fergusson, in six cases by Mr Jones of the Island of Jersey, in one case by Mr Page of Carlisle, in one case by Dr H. Stewart of Belfast, and in two cases by myself. Of the results of these cases I shall give some details immediately. Of the thirteen, three have died, two directly from the effects of the operation, and one from dysentery. The remaining ten are, as far as I know, at present alive. In five the limb is already used freely in progression; in one the result, as regards the usefulness of the limb, is yet uncertain; in one, I am ignorant as to the result; in the remaining three, sufficient time has not yet elapsed to render the result certain, but of each the most favourable expectations may be entertained.

Such is a brief outline of the history of all the cases in which, as far as I can ascertain, the operation has hitherto been performed, and I think I am justified in saying, that an impartial review of these cases, especially of the later series, at least proves that the propriety of the operation is yet an open question.

In order to contribute to the solution of this question, I shall now give a short account of the cases in which the operation has been performed within the last three years, and of the present condition of the cases in which the operation has proved successful; and I shall point out one circumstance which, in my opinion, has hitherto been erroneously allowed, in most cases, to interfere with the success of the operation. The following account of these cases, I should mention, is given, with three exceptions, from my own personal observation of them. To satisfy myself more fully as to the results of the operation than could have been done by a written description of the cases, I lately crossed the channel to the Island of Jersey, where,

by the kindness of Mr Jones, I had an opportunity of fully examining four of the patients, on whom the operation had been successfully performed; and I cannot omit this opportunity of expressing my admiration of the skill and enterprise with which Mr Jones, in a small provincial hospital, has prosecuted this branch of surgery. In addition to the cases of excision of the knee-joint, I saw in Mr Jones' wards two or three admirable results from the same operation on the elbow-joint, and one of excision of the head of the femur, which (apart from the question of the propriety of this mode of practice) would convince the most sceptical as to the usefulness of the limb after this operation.

Mr Fergusson has performed the operation three times in King's College Hospital. The subjects of all these operations were adults.

CASE I.—A male, æt. 21. The operation was performed, July 20th, 1850, and proved fatal on the ninth day from acute necrosis of the femur, the same cause of death apparently as occurred in the child operated on in 1830 by Mr Syme.

CASE II.—A female, æt. 21. The operation was performed October 30, 1852. Considerable constitutional disturbance ensued, which subsided in a few days. Convalescence, however, was protracted, at a subsequent period, by a severe attack of erysipelas. I had an opportunity of examining this patient a short time ago (six months after the performance of the operation). The wound was entirely healed, but one or two superficial sinuses discharging a little matter still existed in its neighbourhood. The limb was shorter than its fellow by about three inches, and slightly bowed outwards at the knee. Slight motion (chiefly antero-posterior) existed between the bones. The limb was still œdematous, from the effects of the erysipelatous attack. The patient moved freely about the ward on crutches. She could bear strong pressure of the tibia upwards, but as yet did not bear any weight on the limb when walking. Her general health appeared to be good.

CASE III.—A female, æt. 28. The operation was performed, April 2, 1853. This case terminated fatally with all the symptoms of pyæmia, sixteen days after the operation.

Of the six operations performed by Mr Jones, four have made excellent permanent recoveries; the fifth is convalescent, and promises an admirable result; the sixth case terminated fatally.

CASE I.—A female, æt. 25. The operation was performed January 19, 1851. Unfortunately this patient was residing at a distant part of the island from St Heliers, and during my short stay of a few hours I was unable to see her. Mr Jones has furnished me with the following account of her present condition:—



She is in perfect health, the parts about the knee having been long entirely healed. The shortening of the limb is a little over three inches. Complete ankylosis has not taken place, so that she requires a support on the inner side of the bone, with which she can move about freely, and can stand at her washing-tub for hours together. She is perfectly satisfied with her condition, and, with a more secure support for the knee, which is being made for her at present, the limb will be rendered still much more serviceable than it now is.

CASE II.—A boy of 11 years of age, when the operation was performed, April 27, 1851. This case appears to have been a peculiarly unfavourable one for the excision. Before the operation was performed, the leg (the left) was fixedly flexed on the thigh, so that the heel nearly touched the hip. The boy was emaciated and worn by hectic, and numerous sinnses existed in the leg and thigh communicating with the diseased bones. The extent of disease necessitated the removal of the femur and tibia to the extent of nearly five inches. His recovery was tedious. The condition of this patient, when I examined him, April 21, 1853, was as follows:—He appeared to be in perfect health. The limb was sound and whole, although numerous cicatrices gave ample evidence of the extent of the previous disease. Complete ankylosis had taken place at the seat of operation, the limb being a little bowed outwards, and slightly flexed at the knee. The shortening of the limb, when compared with the other, was rather under four inches. The muscles of the limb were well-developed. He could walk and run quickly without any aid from a stick, could stand on the limb alone, and, to show me his confidence in it as a support, he *pirouetted* and hopped two or three yards without putting the right leg to the ground. No measurement of the limb had been made subsequently to the performance of the operation; but a careful examination of the apparatus in which it had been placed, and the conviction of Mr Jones and of the nurse who had attended the boy, satisfied me that the limb had grown upwards of two inches since the operation had been performed.

CASE III.—A lady, æt. 30. The operation was performed, September 4, 1851. Everything progressed as favourably as could have been wished, for eight days after the operation. At the end of this time, she was attacked by dysentery, from which she sank fourteen days after the performance of the operation. With regard to the cause of death in this case, Mr Jones writes to me, that “at this time affections of the bowels prevailed everywhere, and more particularly in the vicinity where this lady resided, indeed it was the epidemic of the day. The mortality at this period was very great, and very few persons laboured under or died of any other disease. I feel fully persuaded that the operation was not the im-



mediate cause of death. Those who saw the patient with me were of the same opinion; still I am unwilling even to attempt to prove this."

CASE IV.—A boy, æt. 7. The operation was performed fifteen months ago. The condition of the patient and of the limb previously to the performance of the operation, was very similar to that of Case I., the leg being fixedly flexed to the full extent on the thigh. Rather more than four inches of the femur and tibia were removed in the operation. The condition of this patient, when I examined him, April 21, 1853, was as follows:—The boy is in perfect health, the parts about the knee having been for long entirely healed. Complete ankylosis has taken place, the limb being slightly bent forwards at the knee. The limb is  $2\frac{3}{4}$  inches shorter than its fellow. He stands equally securely on either foot, walks and runs quickly without any support, and, to show me the use he could make of his limb, he ran up and down the ward, kicking his cap like a football with the foot of the ankylosed limb. I need scarcely say that the halt, with which this and the other boy (Case I.) walked, was very considerable and unseemly. Both, however, were provided with shoes, with a firm but light support under the sole, with which they walked steadily and easily, and with but a slight appearance of lameness.

CASE V.—A male, æt. 20. The operation was performed six months ago, previously to which the limb was flexed at an acute angle, as in Cases I. and IV. When I saw this patient (April 21, 1853), he appeared to be in good health. The parts about the knee were firmly cicatrised, with the exception of a superficial sinus, which still continued to discharge a little matter. All swelling had disappeared, and the limb, with the exception of this trifling sinus, appeared perfectly sound, and presented less trace of the operation which had been performed than I could have conceived possible. There was complete ankylosis in the straight position. The extent of shortening of the limb was rather under an inch and a quarter. He walked about the ward with crutches, the limb not yet having acquired sufficient strength to allow of his walking easily without support. He laid aside his crutches, however, and showed me that already he could walk without them, and with but a very slight halt. I have since heard from Mr Jones that this patient is progressing rapidly. As far as I could judge, this case promises the most perfect result which can be reasonably expected, after the removal of the patella, and articulating ends of the femur and tibia.

CASE VI.—A boy, æt. 9. The operation was performed, April 17, 1853. In this case the patella was not removed, its carious surface only having been taken away by the gouge. The head of the tibia and condyles of the femur were removed without division of either the tendinous or ligamentous attachments of the patella. Four

days only having elapsed since the performance of the operation, when I saw this boy, I can, of course, say nothing as to the result. He was suffering little or nothing when I saw him; and Mr Jones writes to me four weeks after the operation, that the boy progresses most favourably, and gives promise of a still more satisfactory result than in any of his former cases.

The next two cases which I have to mention are those in which I have myself performed the operation. The following brief outline of these cases is taken from the hospital reports of my house-surgeon, Dr Thom, under whose immediate care the patients were, and whose care and attention has contributed materially to the hitherto satisfactory result of these cases.

CASE I.—William Harrison, æt. 42, an hostler from Carlisle, was admitted under my care in the Infirmary by the recommendation of Mr Maedonald of Leith, September 28, 1852, suffering under disease of the left knee-joint of five years' standing. The symptoms were those which are usually attributed to ulceration of the cartilages, uniform thickening of the parts around the knee, severe gnawing pain, especially during the night, and much aggravated by the slightest motion of the joint. Considerable relief was obtained by the joint being kept immoveable in leather splints, and by the repeated application of the actual cautery. The thickening of the soft parts became diminished, and I hoped the patient was to recover with a stiff joint. A painful spot, however, remained over the inner side of the head of the tibia, on account of which the counter-irritation was continued, and the joint retained for a long time fixed by the leather splints. He continued in this condition till about the middle of January, when, without assignable cause, the pain in the knee, especially on each side of the head of the tibia, became much aggravated. The pain was now so severe and constant that, in spite of the free and frequently repeated use of morphia, he scarcely slept night nor day. The swelling of the joint again increased, and the foot and leg became oedematous. On the 26th of January I called a consultation of my colleagues on the case, as it appeared to me that the removal of the disease by operation was alone likely to save my patient. It was thought, however, that a repetition of the same measures as had been already adopted, might still save the joint. The leather splints were accordingly readjusted, and the cautery once more applied in front of the joint. No relief, however, was obtained, and after ten days' further delay I yielded (with the consent of my colleagues, who saw the case with me) to the earnest solicitation of the patient, to remove the disease by operation.

The operation was performed, February 5, 1853. A straight incision was made across the front of the joint, a little below the level of the patella, and extending to rather less than half the circumference of the limb, and at right angles to each end of this

transverse incision, a longitudinal incision of about two inches in length gave the wound somewhat the form of the letter H. The operation was performed quite according to the plan of Moreau, the patella being first removed, then the condyles of the femur, and lastly the articular surface of the head of the tibia. It was accompanied by smart hemorrhage from the articular arteries, which was at once arrested by applying ligatures to them. On dividing the tibia with the saw, the cavities of two abscesses in the cancellated texture of the bone, were laid open, each of a size capable of containing a grape. I carefully removed the remaining portion of the walls of these abscesses with the gouge, and then, finding that the diseased portions of bone had been entirely removed, I placed the ends of the tibia and femur in apposition, united the wound by sutures, and fixed the limb in the straight position, by applying a splint on its posterior surface. (The articular surfaces of all these bones were found almost entirely deprived of cartilage; and both the cancellous and laminated structure of the bones, at various points, were in a state of suppuration and caries. The primary disease evidently consisted of suppuration of the cancellous texture of the head of the tibia. The extent of bone removed in the operation amounted to rather more than two inches—an inch and a half of the femur, and a little more than half an inch of the tibia).

The progress of the patient for the first two days following the operation, was most satisfactory. He slept well, which he had not done for weeks before; his pulse never rose above 80; he expressed himself as entirely relieved from the severe pain which he had been previously suffering. On the evening of the third day he began to suffer from hiccough, which very soon became constant, and continued unmitigated by all the remedies which were employed to relieve it, for six successive days and nights. The spasm of the diaphragm at length yielded on the seventh day under the continued pressure of a seven pound weight over the epigastrium, and the pretty free use of the tincture of Indian hemp, and everything went on favourably till about Feb. 23, when he began to complain of pain in the region of the diaphragm, and on pressure over the right hypochondrium. Obstinate diarrhœa succeeded, the evacuations presenting no appearance of bile. He lost all appetite; became desponding as to his recovery, and lost flesh rapidly. The wound, however, never presented, during this time, any very unfavourable appearance. Primary union had failed in the greater part of its extent, but the discharge was moderate, and the entire surface was covered by healthy granulations. Considerable difficulty, however, was experienced from the unfavourable condition of the patient, in keeping the bones in proper position, the end of the thigh-bone having a great tendency to project forwards and outwards. The diarrhœa continued, with short intervals, for about a month, and then gradually ceased under the use of mercurial alteratives, and the repeated application of blisters over the region of the liver. He then began to improve,



and in a short time I considered him out of danger, when he was attacked by acute pleuro-pneumonia of the right side, the inflammation extending apparently over a large surface of the diaphragmatic pleura. Under Dr Douglas' care he again recovered from this attack; and he has now for the last six weeks gone on improving steadily, and is now, I am glad to say, quite convalescent. With regard to the state of the limb during this time, I may mention shortly, that in spite of all the serious constitutional derangement, the wound progressed slowly but steadily. The long-continued diarrhoea, and the emaciated condition of the patient, rendered it no easy matter to keep the bones in good position; but under Dr Thom's careful management, this was satisfactorily accomplished. At the end of six weeks after the operation, the motion at the knee was very limited, and since this time it has progressively diminished.

The present condition of this patient (three months and a half after the operation) is as follows:—His general health is tolerably good, and is improving rapidly; he sleeps and eats well, and has no complaint of uneasiness of any kind. He is still confined to bed, but this is a measure of precaution more than of necessity, to prevent any motion at the seat of operation till the bones are firmly consolidated. The limb, which is supported by a leather splint behind the knee, and a starched bandage, is slightly bowed outwards at the knee, and is one inch and a quarter shorter than its fellow. The wound is healed, with the exception of a granulating surface on the outer side, which may be covered by the point of the finger. On the inner side, too, there is a small discharging surface, where a superficial abscess of trifling extent was opened about a week ago. There is still a little œdema of the whole limb, but this has diminished steadily for some time, and is now nearly gone. The bones at the knee are immoveably fixed as regards lateral motion, but on using a little force, slight motion backwards and forwards can still be perceived. Two or three weeks more, I have no doubt, will serve to complete the osseous ankylosis. He can move the limb freely in all directions, but is directed to keep it in as quiescent a state as possible.

The points in the progress of this case to which I would wish to direct attention, are—1st, That the patient was suffering under a high degree of irritative fever at the time of the operation; 2d, That he suffered, from the third to the tenth day following the operation, from severe and incessant hiccough, which, as the subsequent symptoms proved, was referable to a local source of irritation on the surface of the diaphragm; 3d, That, from the end of the second to the seventh week succeeding the operation, he suffered from nearly constant diarrhoea, evidently dependent on hepatic derangement of a serious character, and which, Mr Macdonald informs me, was of old standing; 4th, That, two months after the operation, he passed safely through a severe attack of pleuro-pneumonia; and lastly, that, in spite of all these untoward complications, the



wound, at the end of three months after the operation, was, with the trifling exception I have mentioned, entirely healed and the bones consolidated, though not quite immoveable, in a nearly straight position.

I think I do not misstate the case, when I say that the serious constitutional symptoms which presented themselves were wholly independent of the peculiarity of the operation, and that this patient survived and made a good recovery, in spite of complications under which he must almost inevitably have sunk, had he suffered amputation of the thigh.

CASE II.—Isaac Johnston, æt. 28, a fisherman from Shetland, was admitted under my care in the Infirmary, February 14, 1853, suffering from disease of the right knee-joint, of about ten months' standing. The affection had commenced, without assignable cause, by pains and swelling of the joint, which gradually increased; and, for two or three months previously to his admission into the hospital, had entirely disabled him from moving about. The condition of the joint was similar to that of Harrison, but the symptoms were less severe. The pain was considerably mitigated by the joint being kept immoveable in leather splints, and by the repeated application of blisters. About a month after his admission into the hospital, the pain again became more severe, and was referred chiefly to the outer side of the head of the tibia. The actual cantery was freely applied, but without giving any relief, while increasing deformity of the joint, and pain on slight motion, gave evidence of the morbid changes which were in progress in and around the articulation. Shortly after this, he had an attack of modified small-pox, from which he speedily recovered. No improvement, however, took place in the condition of the joint. He continued to lose flesh; the pain and the deformity of the joint continued to increase; and symptoms denoting suppuration of the joint presented themselves.

Sir George Ballingall, Dr Dunsmure, and Dr Gillespie, who saw the patient with me in consultation on the 2d of May, agreed with me in the necessity of performing amputation, or excision of the joint, to either of which measures the patient willingly gave his consent.

I performed the operation of excision of the joint on the 5th of May 1853. Having found the disadvantages of the H-shaped incision in my first case, I now exposed the interior of the joint by a semi-lunar incision, extending from the inner side of the inner condyle of the femur to a corresponding point over the outer condyle, the incision passing in front of the joint nearly as low as the tuberosity of the tibia. The flap thus found was dissected back, the *ligamentum patellæ* being divided, and the patella itself left in the substance of the flap. The rest of the operation was completed, as I have already described, with the important exception, that the patella was left in its place, and its immediate attachment left undis-

turbed. The cartilage, however, which remained on its surface was removed by the gouge, as well as the rough surface of bare bone around its articular margin. The amount of bleeding was very trifling: one of the articular branches and several small vessels were secured by ligature, and the wound was dressed and the limb supported as I have already described in my former case. (The interior of the joint presented the usual appearances accompanying advanced strumous disease of the synovial membrane, suppuration of the joint, universal thickening and degeneration of the membrane, and ulceration of the margins of the cartilage in nearly their entire extent. Great part of the cartilage covering the articular end of the bone was as yet unaltered. Three-fourths of an inch of the tibia, and fully an inch and a half of the femur, were removed.) With regard to the progress of this case since the performance of the operation, I need only say that the patient has suffered as little local and constitutional disturbance as usually follows excision of the elbow-joint, and certainly very much less than usually follows amputation of the thigh. He has been almost entirely free from pain, and has slept and eaten well, whilst his general appearance has been such that no one, who was unaware of the operation which had been performed, would, on seeing him, have imagined that he had undergone an operation which was dangerous to life. Nearly a half of the wound is already healed, and the remainder is covered by healthy granulations. The discharge, which has never been great, is already diminishing in quantity. There has not been the slightest tendency to displacement of the bones from the straight position,—a circumstance which I attribute, in a considerable measure, to the patella and its attachments having been left undisturbed. Little more than a fortnight has elapsed since the operation was performed, and I am, therefore, unwilling to say more of the case at present than that it promises, as far as it has gone, a most favourable result.

Whilst writing this notice of the above cases, I have received, by the kindness of Mr Page of Carlisle, an account of another case, in which that gentleman performed the operation about a year ago on a lad of seventeen years of age. The operation was performed, June 7, 1852. The patella, and two and a half inches of the femur and tibia, were removed. At no time after the operation was there any important amount of constitutional disturbance. Mr Page gives the following account of his present condition:—"He is now able to walk quite firmly, and without a stick, for a short distance, and is daily gaining greater control over the limb. He wears a shoe, the sole of which is about three inches thickened, that being the amount of shortening. The thigh and leg bones are firmly united, forming a firm and perfectly straight limb. The size in the situation of the excised joint is about that of the opposite knee."

The only remaining case in which I am aware of the operation having been performed within the last few years, is one in which Dr H. Stewart of Belfast was the operator. Unfortunately I have been

able to obtain no further information from Dr Stewart regarding this case than that he considers the result "very encouraging."

Such is a short summary of the cases, of which I have been able to find any record, or to get any account, in which excision of the knee-joint has been practised. It is possible that other recorded cases may have escaped my observation, and I am not without hope that this communication may elicit further information relating to the practical results of the operation.

Although my chief object has been to give information on the more recent results of the operation, I may be permitted to add a few words in defence of those who have been censured for reviving a mode of practice which, for the last twenty years, appears to have been universally abandoned.

The propriety of attempting to save a limb by excision of the knee-joint seems to depend on the three following considerations:—1st. Is the operation of excision attended by greater or less danger to life than amputation of the thigh? or, may the dangers of the two operations be considered equal? 2d. In the event of recovery after excision of the knee-joint, is the limb more or less useful and seemly than a wooden leg? 3d. Does the long confinement to the horizontal posture, which is necessary after excision of the knee-joint, in any measure counterbalance the benefits of the operation (if such benefits are proved) as compared with amputation of the limb?

A careful consideration of these questions and of the recorded results of the operation, led me several years ago to doubt the propriety of the operation having been rejected from surgical practice. I satisfied myself, by repeated trials on the dead body, that the operation could be performed without difficulty, and without the risk of wounding any important parts; and, as a teacher of surgery, I have been in the habit of mentioning to my pupils my impression that the operation had been rejected from practice on insufficient grounds. Knowing, however, the objections of my hospital colleagues to the operation, I never requested their sanction in carrying it into execution, till the late experience of Mr Fergusson and Mr Jones appeared to me to warrant my urging the question more closely on their attention, and my performing the operation in the cases which I have related.

With regard to the considerations which I have suggested as principally bearing on the merits of the operation, I would submit,—1st, That the danger of the operation may be reasonably expected to be less than that attending amputation of the thigh. The wound necessary for the removal of the diseased bones is less extensive than the wound of amputation of the thigh, whether performed by the circular or flap operation. The large vessels and nerves are not divided in the operation, the parts involved in the incisions being principally the integuments and ligamentous apparatus of the joint; the medullary canal of the bone is not laid open, a point which has of late years been suggested as of some consequence in diminishing the dangers of amputation; the shock, which always attends, to a



greater or less degree, the sudden removal of a large part of the body, is avoided.

Time and experience, however, can alone determine the comparative danger of the two operations. In the mean time, the results of the limited number of cases in which the operation has been recently practised, prove, as far as they go, that the danger to life is not great;<sup>1</sup> and unless some unforeseen accident should occur to the cases, which are at present in progress of convalescence, that the danger is inferior to that of amputation.

2d, With regard to the usefulness and the seemliness of the limb, I need only refer to the account I have given of the results of the operation in Mr Jones' hands, to show that the limb may retain a degree of usefulness which can never be attained by the wooden leg in common use, nor yet by the most expensive and efficient artificial limb which I have ever seen; and if, in the days of Mr Park, such a result could be obtained as that a man, whose knee-joint had been excised, could run up the rigging and perform all the duties of a seaman, surely, with all the resources of modern surgery, we ought to obtain an equally satisfactory result now.

3d, The remaining objection to the operation is the tediousness of the convalescence. This, I think, unquestionably detracts, to a certain extent, from the benefits of the operation. I am doubtful, however, after all, whether the recovery can be proved to be on the whole more tedious than the recovery from compound fracture of the leg; in some cases even the limb seems to have been restored to usefulness as soon as the patient would have been able to walk on a wooden leg, had the limb been amputated. In Mr Syme's case, for instance, "in the course of four weeks after the operation the wound was all but healed, and the limb, before the expiration of three months, had regained so much strength, that the patient could make some use of it in walking."<sup>2</sup>

Mr Syme, in another place, says, "It ought to be recollected, too, that, though recovery from amputation of the thigh is usually completed in three or four weeks, it is generally *at least as many months* before the patient can rest the weight of his body on the face of the stump, so as to use it in standing or walking."<sup>3</sup>

Another objection has been brought forward against the operation which requires to be noticed, viz., that, when the operation has been performed on children, the growth of the limb has been checked, and that, consequently, from the unequal growth of the two limbs, that on which the operation has been performed becomes so disproportioned to the other as to be ultimately useless. The only practical proof of this being so, which I can find, is Mr Syme's case;

<sup>1</sup> Of the last *eleven* cases in which the operation of excision has been performed, *seven* have recovered and *two* are in progress of convalescence, at the periods of six and three weeks after the operation; *two* only have died, one from dysentery and the other from pyæmia.

<sup>2</sup> Syme on Excision of Diseased Joints. 1831.

<sup>3</sup> Ibid.



and I think it is possible that it might be attributed in this instance to ankylosis not having taken place. Experiments have been performed on animals to show that bones do not grow when deprived of their heads, but the results do not appear to be conclusive. A few years will be required to confirm this as a valid objection to the operation. Mr Jones has, in the meantime, made accurate measurements of the limbs of the three boys on whom the operation has been performed, and will have an opportunity of giving further information on the subject hereafter. I have, in an earlier part of this paper, mentioned the fact, that the limb in one of Mr Jones' cases had already, since the operation, grown considerably, and presented now no appearance of checked growth. As bearing on this question, I would be glad to know if the growth of the upper extremity is checked by excision of the elbow-joint. It is so, as far as I remember to have observed, only in a slight degree. Surely the numerous children who have undergone this operation at the age of six or seven, have not grown to adult age with the stunted arm and hand of little more than an infant. Supposing, however, that the fact is so—that the limb is so much *respectively* shortened in after years—the objection applies only to the operation being performed on children, and has nothing to do with the question of the propriety of excision in the adult.

I have suggested that an error has, till lately, been committed in the performance of the operation, which has been allowed to interfere most seriously with its result. I refer to *the removal of the patella*. It is said that the patella is generally extensively diseased in affections of the knee-joint demanding excision or amputation: this, I have no doubt, is an error. The amount of disease to which it is liable is very limited,—in the great majority of cases consisting only in its being more or less deprived of its cartilage, and of a rough, or perhaps carious condition of its articular aspect. The patella is rarely, if ever, the primary seat of the disease in affections of the knee-joint. When the disease commences in the bones, it invariably does so in the cancellated texture of the head of the tibia, or condyles of the femur. It is extremely rare that there is such extent of disease in the patella as to prevent its easy and effectual removal by the gouge, the body of the bone being left uninterfered with. The advantage of leaving the patella cannot fail, I think, to be very great. The natural form of the joint is preserved; the attachment of the extensor muscles is left undivided; the wound is less extensive; the annoying tendency to displacement forwards of the end of the femur seems, in a great measure, to be done away with; and there is every reason to believe that the consolidation of the bones will proceed more rapidly, and the limb ultimately be found both more useful and more seemly than when that bone is taken away. This is a point, however, which remains to be proved. In the two last cases, however, in which the operation has been performed by Mr Jones and myself, the patella has been left, and the

advantages of its having been retained are already apparent in each case.

I shall not lengthen this paper by describing what appears to me the best mode of performing the operation, but merely mention that the semilunar incision seems to me the most advantageous, as being the smallest by which the joint can be satisfactorily exposed, and as giving rise to less bleeding than the H-shaped incision. There is one point, however, to which I wish to direct attention. It has been recommended that a considerable portion of integuments should be removed by a double lunated incision, to prevent the redundancy of skin which might be expected from the large amount of bone removed in the operation. I believe that this advice, if followed, will lead to great annoyance. I have not removed any portion of integuments in the cases in which I have performed the operation, notwithstanding which, the retraction of the skin was such as to cause, in each case, more or less gaping of part of the wound. Mr Fergusson mentioned to me that he had removed a small portion of integuments in the operation, in the case now in King's College Hospital, and that, during the patient's convalescence, he had much reason to regret having done so, as the retraction of the integuments was such as to leave part of the end of the femur uncovered, and a thin cicatrix only now covers this point of bone.

I shall not add any further details as to the performance of the operation or the after-treatment of the patient. My chief object at present is to present a summary of the cases in which the operation has been recently performed, and the results of these cases as far as they have gone, and I have endeavoured to do this faithfully and impartially. From what I have myself seen, I am satisfied as to the utility of the operation, and I think that the details which I have given of these cases prove that the operation, till its recent revival, had been banished from surgical practice on insufficient grounds, and that the propriety of practising it in certain cases, is still at least an open question.



